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The Professional Bulletin of Army Engineers

January-March 2006

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Clear The Way

By Major General Randal R. Castro
Commandant, United States Army Engineer School

Welcome to our Spring issue of *Engineer*. The focus is *One Engineer Regiment—Transforming and Assuring Mobility While at War,* the same theme planned for ENFORCE from 1-5 May 2006. If you make no other plans this year, you need to take advantage of this opportunity for a week filled with dynamic speakers who will share their recent experiences on what engineers are accomplishing in the AOR, at USACE, and in industry. The week will begin in St. Louis and culminate at Fort Leonard Wood with the Regimental Review and Ball. In addition, we will celebrate the successes of engineers throughout the year, to include honoring participants in the Best Sapper Competition.

Our priority remains supporting the Global War on Terrorism and developing innovative solutions to capability gaps, especially with respect to IED defeat. Although there is no silver bullet for eliminating the IED threat, I believe there is a "Silver Path." This path consists of multiple solution sets that, when integrated, can enable our forces to successfully predict, detect, exploit, and neutralize IEDs, while mitigating IED effects and protecting our forces. The IED-defeat ICDT, located at Fort Leonard Wood, is prepared to assist deploying BCTs and sappers with the requisite **skills** and **tools** to conduct mission-focused training in preparation for OIF/OEF.

In March, the 3/2 SBCT completed its mission rehearsal exercise at NTC, integrating the available **skills** and **tools** currently on the Silver Path. Prior to the rotation, 3/2 SBCT received contingency training, including IED-defeat T3, advanced search, route reconnaissance and clearance, robotics, UAV operations, counter-RCIED (remote-controlled improvised explosive device) electronic warfare (CREW), and battle command. Many of the **tools** used for training that accompanied 3/2 SBCT to NTC will follow into theater…including advanced search kits, explosive detection kits, and robotics platforms. As continued materiel capabilities and TTP develop, our team is working to better enable BCTs and deploying units to "train as you fight" prior to deployment.

A key to our success in theater has been our Counter Explosive Hazards Center (CEHC)—our Regiment's "Center of Excellence" for countering explosive hazards—which is fully engaged in the effort to defeat IEDs. CEHC is your resource for lessons learned, countermeasures, intelligence, materiel solutions, and training. When a new training requirement is identified, CEHC can rapidly develop contingency training to close the gap and prepare sappers for combat. In the past few months, CEHC has trained many Army and Marine units in IED-defeat awareness, route reconnaissance and clearance, advanced search, area clearance, equipment maintenance, and integration of the latest lessons learned from the CENTCOM AOR.

CEHC led several initiatives to increase the capabilities of route reconnaissance and clearance teams, including operational testing of the GYROCAM, prototype integration and testing for the CROWS, and prototype testing for the Buffalo RPG cage. We are working to provide route clearance teams and sapper companies with an enhanced capability to investigate potential IEDs using cameras and a mechanical arm to sort through roadside debris. All this has helped reduce engineer casualties in theater. We will continue our efforts!

No one is surprised when I say that the Regiment is multitasking as we deploy, transform, and restation units throughout the force. Our young company commanders and first sergeants are making things happen at the lower level, while battalion commanders and command sergeants major work the higher-level challenges. A success story is the recent activations of the 19th and 20th Engineer Battalions, at Fort Knox and Fort Hood respectively. With the help of DA, FORSCOM, USACE, and the Engineer School, these units have overcome many challenges and are slowly building combat power in preparation for future operations. Great job! In October, we will stand up four more engineer battalions…yes, *four more*!

I want to thank our Regiment's leaders for submitting their Itschner, Van Autreve, Sturgis, and Grizzly award nominations. The books are being reviewed, and the winners will be announced at the Regimental Ball. The books this year were all exceptional and represented the *Essayons* spirit across our Regiment.

I appreciate our commanders and command sergeants major who supported this year's Best Sapper Competition. It is a tremendous opportunity for our junior leaders to represent their units and the force. We will recognize all these Soldiers and present the Lieutenant General Robert B. Flowers bust to the winners.

Lastly, and most importantly, I want to extend a special thanks to all the great engineer officers, NCOs, and Soldiers across the force. Remember that your contribution to the war is not measured by your proximity to direct fire but by what you provide to the success of our Soldiers, our Army, and our Nation in this time of war. Whether you are the Buffalo operator on a route clearance mission in theater, or the instructor teaching clearance operations to deploying Soldiers at Fort Leonard Wood, you are all contributing to the fight, and we are indebted to you for all you do. Be safe, and see you next issue!

Carry On!

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

Greetings to all from Fort Leonard Wood, Missouri, home of the engineers, where training, transformation, and taking care of our leaders and Soldiers are our top priorities! There are extraordinary events taking place in our Regiment every day, and one of the most important of the year is quickly approaching—ENFORCE 2006.

The beginning of ENFORCE 2006 will take place in St. Louis, from 1-3 May 2006, and the conclusion will be at Fort Leonard Wood, from 4-5 May 2006. The theme for the activities will be *One Engineer Regiment—Transforming and Assuring Mobility While at War.* I am looking forward to seeing many of you at this year's events. We have a great week planned, starting with the Council of Colonels/Command Sergeants Major. We need your input and experience as we discuss the issues our Regiment is currently facing while we transform and assure mobility in the Global War on Terrorism.

A great lineup of guest speakers is scheduled this year, to include representatives from the Assistant Chief of Staff, Personnel (G1); the Human Resources Command (HRC); the Gulf Region Division (GRD); the National Training Center (NTC); and the United States Army Engineer School. One of the subjects we'll discuss is the issues facing embedded engineers in the Heavy Brigade Combat Teams (HBCTs). Our sister services will also speak and provide updates that will bridge the gap between engineer capabilities in all services as our armed forces move into a new era of joint operations. Keeping with tradition, we'll have the Army Engineer Association Presidential Dinner, the Regimental Ball, the Engineer Memorial Dedication Service, and the Regimental Review. The second annual Best Sapper Competition will take place, coinciding with ENFORCE for the first time. So select and train your best teams for this extraordinary competition! Finally, the Regiment's leaders will host a dedication ceremony in honor of Sergeant First Class Paul Ray Smith, an engineer who was posthumously awarded the first Medal of Honor for actions in support of Operation Iraqi Freedom. To sum it up, ENFORCE 2006 will undoubtedly instill in each of us an immense pride in our Regiment.

I also felt a tremendous sense of pride at two recent activation ceremonies for the 19th Engineer Battalion at Fort Knox, Kentucky, and the 20th Engineer Battalion at Fort Hood, Texas. These ceremonies are a testament that the modular engineer force is taking shape. In March 2006, the 1st Engineer Battalion from Fort Riley, Kansas, converted to a modular engineer battalion headquarters. The 70th Engineer Battalion, at Fort Carson, Colorado; the 864th and the 14th Engineer Battalions at Fort Lewis, Washington; and the 5th Engineer Battalion, at Fort Leonard Wood, will convert in the near future.

Many units will relocate in the upcoming months as well. As you may already know, the 50th Multirole Bridge Company (MRBC) moved to Fort Leonard Wood in 2005. On the horizon, the 94th Engineer Battalion will relocate to Fort Leonard Wood; and as part of a Base Realignment and Closure (BRAC) decision, the 36th Engineer Group, now at Fort Benning, Georgia, will relocate to Fort Hood this summer and transform to a modular engineer brigade.

One of the major concerns of transformation is training the embedded engineers in the HBCT. We must provide them with the necessary **skills** and **tools** to enable the combatant commander to ensure mobility in concert with maneuver. To assist us in this process, the Engineer School has implemented several functional courses, including the Military Search Operations Course, the Route Reconnaissance/Clearance Operations Course (R2C2), the Route Reconnaissance/Clearance Operations Course – Sapper (R2C2-S), the Route Clearance Equipment (RCE) Maintainer Course, the Area Clearance Course, the Improvised Explosive Device Defeat – Train the Trainer (IEDD-T3) Course, and the Improvised Explosive Device Defeat – Train the Trainer (IEDD-T3) Mobile Training Team (MTT) Course. Currently, these courses are all non-Army Training Requirements and Resources System (ATRRS), contingency-based training. For more information on these courses, visit the Counter Explosive Hazards Center (CEHC) Web site at <*http://www.wood.army.mil/cehc*>.

Two other courses that remain significantly important are the joint Urban Mobility Breaching Course (UMBC) at Camp LeJeune, North Carolina, which has greatly improved the sapper's ability to fight and win in an urban environment; and the Explosive Ordnance Clearance Agent (EOCA) Course, at Redstone Arsenal, Alabama, which provides the basic skills and knowledge required to perform as explosive ordnance clearance agents.

All of these courses are relevant to the current and future fight; however, I ask that the leadership continue to support the Basic Noncommissioned Officer Course (BNCOC) and the Advanced Noncommissioned Officer Course (ANCOC). Both courses are extremely important to the career progression of noncommissioned officers and greatly enhance their ability to perform their wartime mission.

In closing, I'd like to welcome back those Soldiers who have recently returned from a deployment. And to those who have recently departed, I wish a safe and speedy return home. God bless the fallen comrades and their families. We will never forget you.

Heros
With Bulldozers

By Mr. Ralph Peters

America's soldiers are always good for a surprise: The enthusiasm the Army's combat engineers show for our mission in Iraq would dumbfound even our military's most fervent supporters.

Privileged to speak with officers and NCOs from the Army's Maneuver Support Center in Missouri last week, I came away proud to have worn the same uniform as those men and women. Every one of them had served in Iraq or Afghanistan. Now they were briefly back home, working hard to incorporate combat lessons-learned into doctrine and training the young soldiers they'll lead during their next Mideast tours.

All that nonsense about a "broken Army"? What I heard was the conviction that we're not only doing the right thing in Iraq, but doing it far better than the media tell the American people.

Along with those combat engineers, the audience consisted of infantry, military police and chemical corps leaders—veterans all. Not one was discouraged by the political tempests blowing in Washington (where the hot air is a prime cause of global warming). The best word for what our soldiers displayed is *zeal*.

I only wish my fellow citizens were given an honest view of our troops, their morale and their accomplishments—along with a fuller sense of our military's complexity. Yes, the infantry leads the way, along with the other combat arms. But who hears about the combat engineers? Even though they often *lead* the infantry?

Well, here's to the heroes who clear the minefields, defuse the improvised explosive devices (IEDs), blow open the doors, dig the trenches, build the defensive barriers, renovate the schools and clinics, plunge into the tangle of wires that passes for an electrical grid—*and* fight as infantrymen when the need arises.

When you see those dramatic photographs of infantry teams taking down an urban target, the soldiers *up front* are often combat engineers, opening a path for the grunts to go in.

Every branch of our Army makes its own unsung contributions, but a glimpse at the combat engineers offers a sense of how complex the Iraq mission really is—and how bravely those in uniform have faced up to the challenges. So here are a few anecdotes from the officers and NCOs I met last week:

- All a soldier has to do to make headlines is to whine to a reporter. But we don't hear about the NCO lying in a stateside hospital ward who, after losing an eye defusing an IED, begged his visiting commander to help him get back to his unit in Iraq.
- In the past, active-duty leaders often dismissed the National Guard as "weekend warriors." Not anymore. The highest praise I heard was for a "dump-truck" outfit, the 1457th Engineer Battalion from the Utah National Guard, that served in Baghdad and central Iraq. A colonel described them as remarkably brave and resourceful. Operating at as low as 65 percent of their authorized strength, those mountain lions from the Rockies never ducked a high-risk mission—whether they'd been trained for it or not.
- When the highly paid contractors failed to show up with the bullets flying, combat engineers often were thrown in to get the electricity working out in the boonies. And they did. But all we heard about were the problems in Baghdad — where the contractors were responsible.
- Having just returned from Iraq, one officer said, "I'd give up my promotion to go back." Even allowing for the moment's enthusiasm, that family man *believed* that his sacrifices made a vital difference. Why don't men like him make the evening news?
- Even during an occupation, the Army has to train for its full range of missions. At a division commander's request, our engineers built a tank-gunnery range with 64 *miles* of protective berms to keep the main-gun rounds from going astray. One example among many—all in a day's work for the bulldozer boys.
- That day's work includes some of the most dangerous missions in Iraq—defusing IEDs. The equipment and techniques have gotten better, but it remains a nerve-wracking challenge. Combat engineers *volunteer* to do it.
- As in the Army's better-known units, our combat engineers see impressive *re*-enlistment rates. Soldiers sign up knowing they'll be sent back to Iraq. Tough as it is, they love what they do. As one command sergeant major put it, "This is what they signed up for, this is what it's all about."

Of course, no list of this sort can begin to capture the courage of these soldiers. They have families they love and the prospect of long lives in the greatest country on earth. Yet, they continue to risk death or mutilation because they will not quit on America—or Iraq—in the middle of a war.

At a time when we're bombarded with so much doom-and-gloom nonsense from those who'd like to abandon the world to terrorists, it's a shame we don't hear more about the men and women who *stay* in uniform, who do our nation's toughest work and receive so little credit from the know-it-alls safe at home.

Harvard and Yale? Keep 'em. The finest Americans are those who have gone through the School of the Soldier. A "broken military"? Nope. Anyway, if it was broken, the combat engineers would fix it. Under fire.

Mr. Peters, a retired Army intelligence officer, has published and lectured extensively on military and international concerns. His latest book is "New Glory: Expanding America's Global Supremacy."

This article is a reprint from the January 20, 2006, New York Post.

FUSION CELL

By Sergeant First Class Christopher T. Sanson

The Fusion Cell is the United States Army Engineer School answer to the requirement for a central coordination cell to bring together the people who can answer the multitude of questions so often heard throughout the Engineer Regiment in these fast-moving times. *"When are we doing our base realignment and closure (BRAC) move?" "When are we deploying to support Operation Iraqi Freedom?" "When are we transforming to the Future Engineer Force modular design?" "Which modular design are we transforming to?" "Where do we send our equipment?" "How are we getting our new equipment?"* These and hundreds of other questions need to be answered, and often the answers are not readily apparent or even finalized.

Purpose

The Fusion Cell's mission is to gather and present data on the current state of engineer transformation, restationing, and support to the Global War on Terrorism (GWOT). It is not, in itself, responsible for correcting problems and issues; its role is to assist in issue identification, facilitate communication, and assist in issue resolution.

The Fusion Cell was born from the need to synchronize the Regiment's actions as it sails ahead, with three major waves (significant actions) surging together like the proverbial "perfect storm" and threatening to sink the ship of progress:

- Global repositioning and BRAC.
- Deployment in support of GWOT.
- Transformation to the modular Regiment.

In September 2005, the Cell was formed as a means of synchronizing and deconflicting these potentially counteracting requirements. It is possible to have a situation where an engineer unit is identified to relocate to the continental United States (CONUS) as part of global repositioning, transform into the modular force or stand up as a new unit, and deploy in support of GWOT within the same calendar year. However, it is not feasible to expect a unit to undergo such significant change within the same year, so one of the most critical functions of the Fusion Cell has been to work with the Department of the Army (DA) to modify the timing of basings, force structure changes, or GWOT rotations. The senior engineer leaders are aggressively engaging the DA staff to synchronize challenges and maximize the abilities of units to manage the rate of change in a given year. Ensuring that this happens is a massive undertaking, and to accomplish it requires communication with numerous organizations, including the installation, the United States Army Forces Command (FORSCOM), DA, and others.

Challenges

Working primarily with Active Army Future Engineer Force units outside the brigade combat teams, many challenges and recurring issues arise. The biggest challenge is getting the personnel and equipment to the unit with sufficient time remaining to conduct the required training in preparation for a GWOT deployment. Time is the biggest hurdle since many tasks are being done concurrently.

Activating a unit from scratch is a very challenging task, especially for the unit's commander and staff. Once the United States Army Human Resources Command (HRC) identifies the personnel for the unit, the key personnel must hit the ground running and set the foundation for the rest of the unit to arrive. A key issue is that HRC assigns personnel to the installations. Units that will be next in line on their installation to deploy must work with their installation to ensure that they receive the inbound personnel who have the required military occupational specialties (MOSs), particularly if there are other engineer units on that installation.

The task of securing the motor pools, barracks, and orderly rooms may or may not be an easy one, depending on the facilities available on the installation. Lessons learned show that an early and thorough scrub of the end-state modified table of organization and equipment (MTOE) is key to ensuring that the unit gets the right equipment as quickly as possible. A unit identification code (UIC) allows the unit to receive personnel, equipment, and funding from their major command. However, *no* funding solely intended for transformation is being issued to units. Newly activated units are given operational funds like every other unit in the Army, and no more.

An engineer higher headquarters will not necessarily reside on the same installation to provide support to the activating unit. A key event is assigning a parent unit to facilitate the unit's activation. In the future, parent units will provide guidance from the experiences of units that have already activated or transformed into the same type of unit. The goal should be that the personnel arrive at the activating unit in time to operate and maintain the equipment as it arrives. Often, many of the items needed are on another installation and require coordination for movement.

A converting unit may have some of the same issues but normally will have an easier time if it remains on the same installation, because some of the personnel and equipment are retained when the unit transforms. Again, completing an early scrub of the MTOE is a key factor in doing this successfully. Based on the master plan for the installation and the transformation of its units, individual units may have to move somewhere else on the installation, but the support structure will remain intact. Any excess equipment will be identified and sent where it is needed.

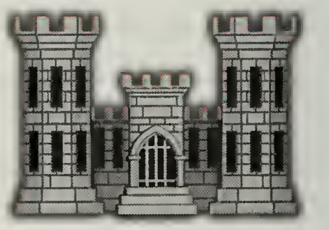
Summary

These are only some of the most prevalent issues discussed in Fusion Cell sessions. These sessions will continue for an indefinite time into the future. The hard work of the Office of the Chief of Engineers (OCE); HRC; FORSCOM; United States Army Tank-Automotive and Armaments Command (TACOM); DA Assistant Chief of Staff, Operations and Plans (G-3) and Assistant Chief of Staff, Finance (G-8) staffs; and many others—as participants in Cell sessions and members of the team—have provided an outstanding forum in which to solve problems and conflicts. Many engineer units will ride at least one of the waves of the perfect storm in the same year, but will be able to have a helping hand along the way.

Units are encouraged to use the weekly session to help prepare their plans, using the lessons learned and issues discussed by other units that are activating, converting, or rebasing. Useful information has been posted to an Army Knowledge Online (AKO) site. Contact the Fusion Cell noncommissioned officer in charge at <*Christopher.sanson@us.army.mil*> or the link provided on the USAES home page for any questions or for access to the files.

Sergeant First Class Sanson is the noncommissioned officer in charge of the United States Army Engineer School Fusion Cell.

The Engineer Castle



The appropriateness of the turreted castle as a symbol of the Army Corps of Engineers is readily apparent. The medieval castle is inseparably connected with fortifications and architecture. In heraldry, the castle and the tower are often used on coats of arms or given as charges in the shield of individuals who overcame walled fortifications, were the first to mount their walls, or successfully defended them. In this country, the term "castle" has been applied to the strongest of our early fortifications, such as Castle Pickney in Charleston, South Carolina, and Castle Williams and Clinton in New York Harbor.

The castle is a highly stylized form without decoration or embellishment. The Army officially adopted the castle to appear on the Corps of Engineers epaulets and belt plate in 1840. Soon afterward, the cadets at West Point—all of whom were part of the Corps of Engineers until the Military Academy left the charge of the Chief of Engineers and came under the charge of the Army at Large in 1866—also wore the castle on their cap beginning in 1841. Subsequently, the castle appeared on the shoulder knot, on the saddle cloth, as a collar device, and on the buttons. Although its design has changed many times since its inception, the castle has remained the distinctive symbol of the Corps of Engineers.

Building an Airplane While It's Flying

Interim Lessons Learned on Activating a Battalion Already Slated to Deploy

By Lieutenant Colonel Courtney W. Paul and Major Jason S. Denney

A popular advertisement of Electronic Data Systems Corporation refers to the challenges of "building an airplane while it's flying." Standing up an engineer battalion from scratch, that is on a planning deployment document the day it activates, can be as difficult a challenge. What follows is one version of what faces a commander and his staff when starting a unit and building it from the ground up, as well as some suggestions on a plan of action and issues to be aware of. Department of the Army (DA), major commands, and installation staff officers may read this article and see where their actions can impact and influence future activations of the Engineer Regiment in a positive manner.

Standing Up the Battalion

So you've just gotten the telephone call and are a bit incredulous that a few individuals and a couple of borrowed computers setting on Defense Reutilization and Marketing Office furniture in a transient office building are all that exist of the proud battalion depicted in your modified table of organization and equipment (MTOE). What next? The following steps will help you get started in the right direction:

Assess Your Situation

As you activate, find out when and where you are to deploy. Old standards of having up to a year of protected C-5 reporting status on the unit status report (USR) are gone, and you will have to continually explain that fact to individuals in agencies you deal with. The following validated assumptions will help you assess the picture:

- The priority on personnel, equipment, and funding is directly proportional to the amount of time before deployment. And if you find yourself with 20 months available before deployment rather than less than a year, many of these concerns will still be valid.
- It is important that you know when DA and the United States Army Forces Command (FORSCOM) will be building your force structure for your deployment and that you can convey the complete story when it is ready to be heard and acted upon.
- Personnel fill will be from the top and the bottom, which means you'll have a couple of field grade officers and senior noncommissioned officers and a graduating class of advanced individual training (AIT) students.
- Equipment fill is a laborious process. Assess getting training sets from a variety of sources, and then accept that drawing equipment in theater is a likely consequence.
- The standard resourcing model is to give you your operations and maintenance allotment for the year. This is not enough to stand up the unit, but everything else will have to be treated like an unfinanced requirement (UFR) request.

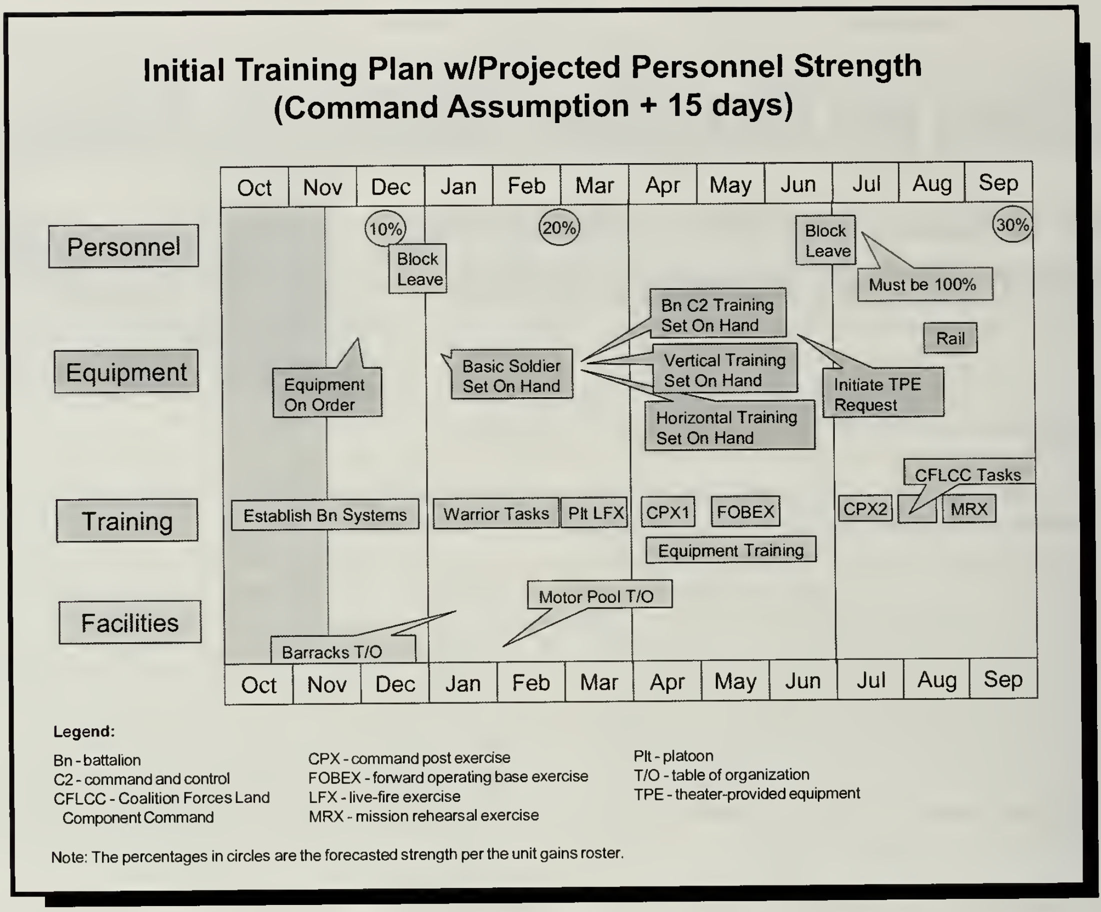
Meet People

Identify all of the organizations you may have to deal with and who can make things happen for you. Depending on your command and control arrangement, your higher headquarters staff may suffice. In some cases it won't, particularly if your command and control arrangement is based on geography and not mission and your unit and your higher headquarters have widely divergent missions. The garrison/installation staff will likely have a wide and compartmentalized staff. You will need to personally meet with them to impress the urgency of standing up the unit and to give them a face for who needs help.

Develop a Training Plan

After assessing where your unit stands, develop a training plan that takes into consideration your personnel gains and your equipment training set availability. Accept that the unit will not be able to do much training until you get the right mix of key personnel and about 20 to 25 percent strength on the ground. With less than a year to deploy, the 19th Engineer Battalion used a plan that focused first on establishing battalion systems, and then in the second quarter used a "warrior phase" that focused on the warrior tasks, medical training, individual schools, and squad situational training exercises. Only in the third quarter was the unit able to focus on engineer-specific and collective tasks above platoon level.

As you establish this plan, you will continually have to assess your training plan against the personnel gains.


Initial Training Plan w/Projected Personnel Strength (Command Assumption + 15 days)

Legend:

Bn - battalion
C2 - command and control
CFLCC - Coalition Forces Land Component Command
CPX - command post exercise
FOBEX - forward operating base exercise
LFX - live-fire exercise
MRX - mission rehearsal exercise
Plt - platoon
T/O - table of organization
TPE - theater-provided equipment

Note: The percentages in circles are the forecasted strength per the unit gains roster.

Figure 1

Unfortunately, the gains roster proves to be only an approximation of who is coming in and really doesn't become accurate until about 2 to 3 months out. Figure 1 shows an example of what that initial training plan might look like. A comparison to Figure 2 shows the difficulty of using the gains roster as a forecasting tool.

Reassess and Report

Continually assess your unit based on its go-to-war standard. Report your status through vehicles like the weekly commander's situational report and USR. Work through your higher headquarters to establish a series of in-progress review meetings to get visibility on your situation and to facilitate vertical and horizontal synchronization among the higher-echelon staffs.

Accept that the Army and FORSCOM staffs' center of gravity is focused on the transformation of brigade combat teams (BCTs), so your reports will have to address the level of urgency that otherwise gets lost in the background noise. The United States Army Engineer School Fusion Cell video teleconferences (VTCs) (see article on page 5) were another great forum for reporting status. While not an official function of the Engineer School, this weekly VTC proved to be the best location to raise issues and simultaneously see the coordination between staffs and functional areas. As this goes on, continue to fight for resources as you train. Use your training plan to trigger "redlines" (key dates where you have to have certain resources or a readiness shortfall occurs), and report them through every available vehicle.

Be Ready

Be ready to react to all sorts of unforeseen issues with standing up; this airplane you are building is not on autopilot.

Challenges

Following are some of the challenges the 19th Engineer Battalion encountered. They are shared in the interest of allowing new units to avoid them or equipping staffs with some insights of what may lay ahead.

School Training

Scheduling classes and filling with the right military occupational specialty (MOS)-qualified Soldiers is a challenge. Availability of the basic courses needed to operate a battalion may be an issue based on location (see *Location, location, location* on page 10).

Many mobile training teams (MTTs) will not travel to locations that cannot generate a BCT's worth of training slots. It is not that they are unwilling; it is that generally they are

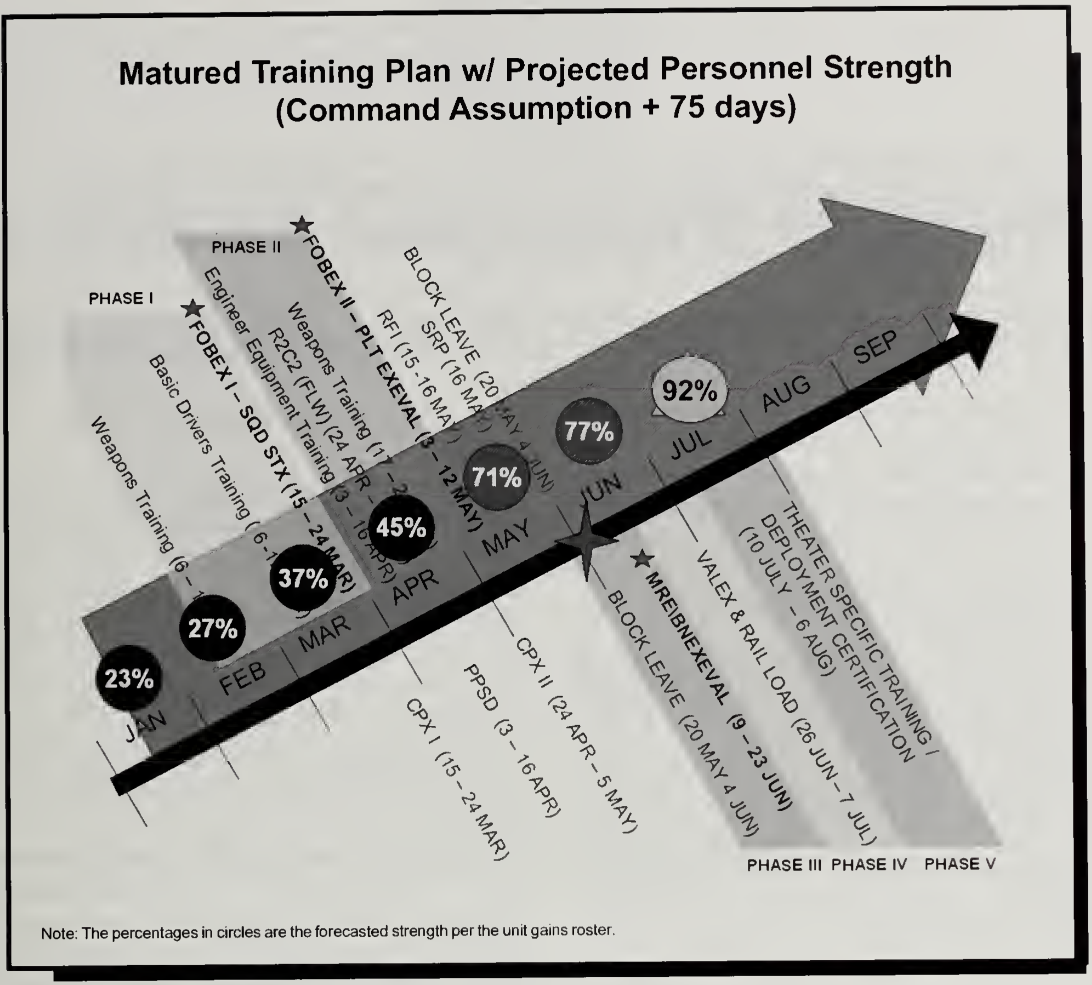

Matured Training Plan w/ Projected Personnel Strength
(Command Assumption + 75 days)
PHASE I
PHASE II
PHASE III
PHASE IV
PHASE V
Weapons Training (6 – 1
Basic Drivers Training (6-1
★FOBEX I – SQD STX (15 – 24 MAR)
Engineer Equipment Training (3 – 16 APR)
R2C2 (FLW) (24 APR –
Weapons Training (17 – 2
★FOBEX II – PLT EXEVAL (3 – 12 MAY)
RFI (15 -16 MAY)
SRP (16 MAY)
BLOCK LEAVE (20 MAY 4 JUN)
23%
27%
37%
45%
71%
77%
92%
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
CPX I (15 – 24 MAR)
PPSD (3 – 16 APR)
CPX II (24 APR – 5 MAY)
BLOCK LEAVE (20 MAY 4 JUN)
★MREIBNEXEVAL (9 – 23 JUN)
VALEX & RAIL LOAD (26 JUN – 7 JUL)
THEATER SPECIFIC TRAINING / DEPLOYMENT CERTIFICATION (10 JULY – 6 AUG)
Note: The percentages in circles are the forecasted strength per the unit gains roster.

Figure 2

unable to due to their schedule and the number of instructors available. This results in a heavy reliance on piggybacking MTTs at other installations, tapping into the Reserve Component schools, and other creative solutions.

School costs consume a large portion of the budget. The school requirements list should be developed early, for both Military Training Specific Allotment (MTSA) and non-MTSA funding, to prioritize and to provide the Resource Management Office an awareness of the scope of the funding requirement.

The commander must decide where to take risk in the training plan based on the perceived downrange mission, projected troops and time available, and estimated equipment available. Depending on the location, this finely tuned plan can be easily aggravated by training resources that may have been locked in by program of instruction (POI) requirements prior to the unit even activating.

Ammunition

Be aware of long lead times, and request your Standards and Training Commission (STRAC) allocation as soon as possible. Even then, the unit will likely have to borrow ammunition for its early individual qualification ranges, so establish those points of contact at your installation.

Materiel

It is absolutely essential that all Class VII items be placed on order as soon as possible. This briefs well, but is hard to accomplish without the proper personnel and Standard Army Management Information System (STAMIS) equipment on hand to execute.

Prioritize MTOE into minimal essential sets. These initial sets should include a basic Soldier set and training equipment sets. The basic Soldier set should consist of the minimal equipment necessary to train basic warrior skills and should be the first to arrive, along with initial troops and leaders. The training equipment sets are the minimal equipment required to conduct essential MOS-specific individual tasks and selected collective tasks. These training equipment sets need to arrive, fully mission capable, in time to support the commander's training timeline.

In a perfect world, equipment transfer directives would be issued as soon as the MTOE was approved and would be waiting in holding yards for the unit to pick up on its effective date (E-date). Reality is a different story. This equipment transfer process is even more of a challenge when the unit has no corps headquarters to assist in the process. A corps will ensure that all of its shortages are filled within, prior to transferring excess equipment to a direct-reporting FORSCOM unit.

FORSCOM must exhaust internal excess—through equipment transfer directives—prior to the DA Assistant Chief of Staff, Finance (G-8), contacting the item managers to request a release of equipment. This process should be a synchronized effort between the FORSCOM Assistant Chief of Staff, Logistics (G-4); the DA G-8; the United States Army Materiel Command; and item managers.

Personnel

Installation Assistant Chief of Staff, Personnel (G-1)/Adjutant General, must submit a request to add the battalion to the command section list early to get a commander on board. Early fill of leadership and key positions is essential (commander, command sergeants major, executive officer, S-3s, company commanders, first sergeants, personnel specialists, property book officers, supply sergeants). The leadership core should be on the ground prior to the influx of initial-entry training (IET) Soldiers.

Ensure that the installation strength manager works closely with the United States Army Human Resources Command (HRC), Distribution Division Branch, to validate personnel requirements and generate valid, open, unfilled (VOU) requirements for all open MTOE positions. Use the Enlisted Distribution and Assignment System (EDAS) and Total Officer Personnel Management Information System (TOPMIS) II to validate requisitions focusing on nonengineer MOSs, because these will slip through the cracks.

Facilities

Short-term activation requires the redrawing of unit footprints to integrate new organizations, but installations are accustomed to the long-term timeline of military construction. Work with the installation to develop an interim move plan that has the flexibility to meet the maturing requirements of the unit.

Funding

There is no such thing as modularity funding for echelon-above-brigade (EAB) units. Everything is a UFR.

Identify UFRs early, and submit them to FORSCOM to validate the requirements. In addition to the normal operation and maintenance cost, the unit must be funded for initial purchase of all stock-funded MTOE items, organizational clothing and individual equipment (OCIE), automated data processing equipment, and establishment of basic loads of all classes of supply.

The model used to project operation and maintenance requirements doesn't take into account all the activation costs associated with standing up a new unit. The establishment of unit basic loads and temporary duty cost associated with the school's requirement alone can burn much of the operational budget. The mass inflow of equipment transfer that is not quite at 10/20 standards can easily exhaust the remaining funds.

For various reasons, the unit will likely activate at the beginning of the fiscal year; for example, because of the chance of the federal government operating under a Continued Resolution Authority at the beginning of the fiscal year. This is fine for units that had a budget the previous year, but compounds the problems of a newly formed unit.

Additional Issues

While you may not have any control over it, begin the process early. Strive for as much time as possible between the establishment of the carrier unit identification code (UIC) and the E-date of the unit. To have only 13 days between the E-date of the carrier unit and the activation of the unit is *not* optimum.

Location, location, location. While in theory all Army installations now are Installation Management Agency installations (meaning there are no TRADOC or FORSCOM installations), the truth is that some installations are better suited for the multitude of tasks associated with activating a battalion. The facts are that an installation staff without an associated corps or division headquarters is rather thin. Distinct advantages can be observed between activating a unit at a location with corps staff present and a location that has not had a FORSCOM unit larger than a company on it since the mid-90s.

While an activating BCT will have an assigned Modular Force Coordination Cell, a Materiel Management Center, and the direct oversight of Headquarters, Department of the Army (HQDA), an EAB unit will seem like it is on its own. The Engineer School's Fusion Cell is the keystone to bringing together all the key players needed to assist the unit going through activation or Future Engineer Force conversion. The Fusion Cell is a direct conduit and voice amplifier for an EAB unit to communicate its questions, concerns, and issues to FORSCOM, HRC, and HQDA.

Conclusion

We acknowledge that our airplane is far from complete, and a lot of work lies ahead before we can land the plane in theater. However, as things continue to change in today's dynamic environment, hopefully others who also find themselves "building an airplane in the air" can benefit from our first experiences.

Lieutenant Colonel Paul is the commander of the 19th Engineer Battalion. His previous assignments include commander of the 3-410 Engineer Training Support Battalion and executive officer for the 1st Infantry Division Engineer Brigade during Operation Iraqi Freedom II.

Major Denney is the executive officer of the 19th Engineer Battalion. His previous assignments include brigade engineer for the Unit of Action Maneuver Battle Lab and observer-controller at the Combat Maneuver Training Center.

Combat Support Brigade (Maneuver Enhancement)

By Mr. Klaude A. "Tony" Miller and Mr. David L. Draker

The Army Transformation Plan (ATP) Roadmap of 2003 laid the blueprint for a radically different Army structure to be in place by 2014. The ATP marks the beginning of the end for the fixed-organization structure within the division and corps. In its place, a modular structure will be the hallmark of the future Army.

Transformation Plan

The Army will consist of new corps and division headquarters designed for joint force operations and for command and control of a tailored mix of forces capable of supporting full-spectrum operations. The traditional combat brigades will be restructured into modular forces called Brigade Combat Teams (BCTs) with improved force mixes, sustainability, and command and control supporting full-spectrum operations. While there will be different types of BCTs (Heavy, Stryker, and Infantry), they will be based on standard configurations, eventually evolving into the Future Combat Systems Brigade.

Along with the restructured BCT, some of the supporting structures of the traditional corps and division will be remodeled. There will be five new brigade-sized units designed to support the deployment and sustainment of the new BCTs. The first four new brigades are the Aviation Brigade, the Fires Brigade, the Battlefield Surveillance Brigade, and the Sustainment Brigade. All of these brigades are now under development as their concepts and organizational structures are shaped to support the modularity designs of the future Army. The last brigade element, the Combat Support Brigade (CSB) (Maneuver Enhancement [ME]), is the subject of this article.

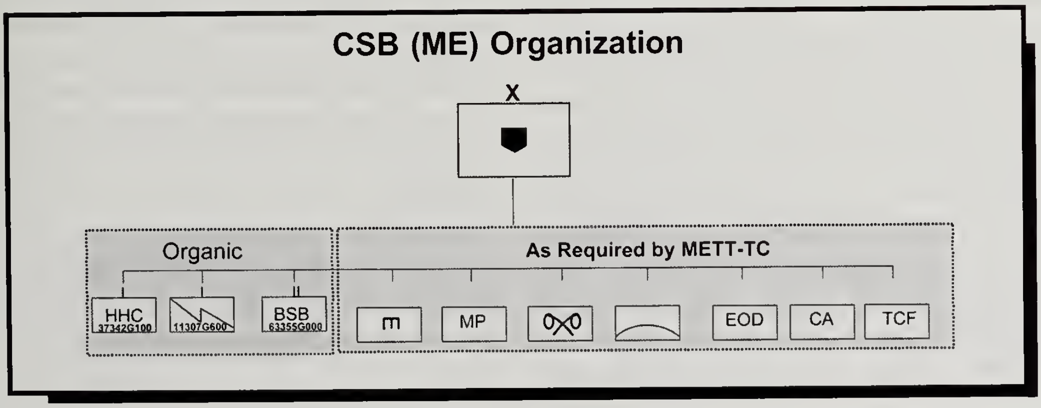
CSB (ME) Development

While each of the other support brigades can draw its lineage from previous organizations, the CSB (ME) has no direct precedent. It is a new headquarters structured to provide a single command-and-control element for multiple functions. Formerly, these multiple functions required individual command-and-control elements and force structures. The CSB (ME) combines disparate functional units such as engineer, military police (MP), chemical, signal, rear-area operations, and (when assigned) a tactical combat force (TCF) into the new organization structure.

Requirements

The new modularity concepts of the Army require a force structure that is responsive, flexible, manpower-efficient, and multifunctional. Additionally, the force requires capabilities in both joint- and single-component deployments and operations. Further, the force needs to accommodate new ideas in force packaging and deployment processes and be able to deploy as a self-contained unit in a nonlinear, noncontiguous operational environment. The CSB (ME) has been designed with all of these principles in mind.

The CSB (ME) was previously designated as the Maneuver Enhancement Brigade. The recent Army-level name change



has not lessened the basic tenet of the unit's mission: *Provide critical maneuver support to the supported force commander, normally at division level.*

In addition to maneuver support, the CSB (ME) addresses the need to provide multiple-proponent functions throughout the theater of operations without creating the large overhead associated with a division or corps rear command post. The new brigade has two major missions:

- *Maneuver support*—the integrated application of assured mobility and protection capabilities.
- *Terrain management*—within an assigned area of operations.

The CSB (ME) provides maneuver support through the provision of several major tasks: assured mobility, protection, terrain management, infrastructure development, and rear-area operations. These tasks are performed throughout an area of operations to ensure freedom of maneuver and preserve combat power. Previously, the division headquarters performed the functions of terrain management, infrastructure development, and rear-area operations—all of which have now devolved to the CSB (ME) within its area of operations.

- *Assured mobility* encompasses actions designed to guarantee the force commander the ability to move and maneuver where and when he desires, without interruption or delay, to achieve his intent.
- *Protection* covers actions intended to protect the integrity of the individual, the organization, and the force—both individually and collectively.
- *Terrain management* operations are actions that preserve the ability to operate and occupy the areas between the BCTs and the corps.
- *Infrastructure development* is restoration activities that support the return of stability and security in an occupied area and prepare the way for nation building and the return of internal national control.
- *Rear-area operations* enable the use of terrain and urban areas by forces not directly engaged in combat operations and allow the continuous provision of supplies and services to the committed forces.

Design Features

The CSB (ME) has several features to enable the support of full-spectrum operations. The design of the headquarters incorporates the ideas of modularity and multifunctional control. It will be robust and capable of operations in a noncontiguous, nonlinear environment. The only permanent structure of the CSB (ME) is the headquarters element with communications and logistics support.

The CSB (ME) force structure will be a tailored force based on the requirements of mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC). Generally, the brigade will consist of three to eight battalions of engineer, chemical, and military police units and will be specifically tailored with the addition of unique-capability units, such as explosive ordnance disposal (EOD) and civil affairs (CA), as needed.

The brigade headquarters has the necessary staffing to provide command and control for these combined functions. Each function is represented within the brigade staff through a planning and operations cell providing functional recommendations and decision-making information to the S-3 and the command group. Additional capability for multifunctional command and control is provided through a robust liaison cell.

While designed to control multifunctional forces, the brigade can also coordinate with a functional brigade to provide support to the division or corps. Based on the mission, the CSB (ME) may even detach a functional battalion to the functional brigade.

Initially, divisional BCTs will receive task-organized forces from the Army force pool based on METT-TC. When required by the division, the CSB (ME) may provide task forces to support BCT requirements for assured mobility and functional capabilities that go beyond the BCT's organic capabilities. The brigade can organize a task force, provide support and reachback capability, and then on return, refit the task force when the mission is completed.

Because of the nonlinear and noncontiguous nature of the future battlefield, the CSB (ME) was designed to operate in multiple areas. The brigade headquarters can deploy both a main and a tactical command post (CP) with the ability to compose and deploy an additional CP to support short-term or limited-objective missions such as sensitive-site exploitations. The CSB (ME) will have a dedicated organic brigade support battalion (BSB) to provide supply and transportation functions to the deployed units of the brigade.

A last major design feature is the addition of a section within the S-3 to provide the terrain management and rear-area functions. In the division area of operations, the CSB (ME) will perform missions such as coordination of stationing, base defense, protection of lines of communication, and area and local security.

The individual unit and base cluster retain defense responsibilities of the unit or base. However, when the threat level exceeds the capability of the organization, the CSB (ME) will provide for additional defensive support through the use of the assigned military police or tactical combat force. This assigned force will provide a needed tactical capability short of assigning a BCT with the protection mission.

Transition

While the exact stationing of the new CSB (ME) headquarters organizations has not been decided, the number of units will extend across the entire Army force structure. A limited number of organizations will be placed in the Active

(Continued on page 24)

One Team – One Fight

By Captain Lee Edmonds, Captain Brian Stone, First Lieutenant Carlos Restrepo, and First Lieutenant Charles Heaton

Task Force 91st Engineer Battalion, 2d Brigade Combat Team, 1st Cavalry Division, was assigned an area of operations in northwestern Baghdad from February 2004 to February 2005. Stability operations within the area established an around-the-clock operations tempo for the task force. Alpha Company, Task Force 91st Engineer Battalion, maintained operational control of 3d Platoon, Charlie Company, 458th Engineer Battalion (Wheeled), United States Army Reserve (USAR), which became known as 4th Platoon, Alpha Company, Task Force 91st Engineer Battalion. As with other Reserve units, the Soldiers held a variety of civilian jobs—students, teachers, local and state police officers, mechanics, and accountants. The true asset of this platoon was its manpower and combat engineer training.

Integration of 4th Platoon

During the mobilization time in Kuwait, 4th Platoon had no idea what its mission would be, so the Soldiers focused on individual combat engineering tasks and platoon collective tasks. Realizing that the ability to effectively execute its squad and platoon tasks would require them to have a foundation or basis of knowledge, the platoon set about achieving this knowledge. It did not focus on engineer annexes or engineer-specific tasks but rather on understanding basic troop-leading procedures, especially the operation order (OPORD). The platoon members trained on the simple five-paragraph OPORD, which became the known standard within the platoon.

As the leadership received warning orders (WARNOs) and OPORDs, the Soldiers knew that a mission was about to be executed and their preparation was key to the success of that mission. The ability to parallel plan and prepare proved to be critical for all units. The leadership consistently mentioned and relied on basic troop-leading procedures when it came to not only combat missions but also base camp tasks.

Alpha Company's mission was to conduct stability operations in the area of operations, which was composed primarily of Iraqi Sunnis. The 4th Platoon received training on cultural awareness, as well as convoy procedures, close-quarters combat techniques, first aid, and specific tasks associated with its mission.

The company master driver immediately began driver's training and licensing of the platoon members on the company's primary combat vehicles. The training was intensive, and on completion, the 4th Platoon became the wheeled platoon for Alpha Company.

The platoon zeroed and qualified its weapons, conducted numerous close-quarters combat ranges, and refined its standing operating procedures for urban operations. In 2 weeks time, 4th Platoon was virtually identical to the other three platoons in the company, with regard to training competency.

The driver's training, arming, and equipping of 4th Platoon was the least difficult part of integrating the platoon into the company. The challenge facing the platoon was to quickly understand the tactics, techniques, and procedures the company established within sector.

To facilitate the integration of 4th Platoon to the company's stability mission, a squad from 2d Platoon was task-organized under the command and control of 4th Platoon and a squad from 4th Platoon was task-organized under 2d Platoon. The squad from 4th Platoon observed and noted the tactics, techniques, and procedures of 2d Platoon and brought this knowledge and strength back to 4th Platoon.

4th Platoon Joins the Fight

The stability missions in the company sector were movement to contact, cordon and search, route security, and route clearance. The first mission given to 4th Platoon was a cordon and search for possible weapons and the questioning of a particular individual.

The platoon developed an initial plan of conducting an area reconnaissance in the neighborhood of the target as part of its patrol cycle. Each squad was given certain information requirements to observe and attain during its reconnaissance. As the platoon collected and analyzed the intelligence, it finalized the plan and issued an OPORD. The rehearsals were focused on a quick and thorough search inside the target and the actions of the squads and vehicles outside of the target. The platoon sergeant was to supervise the outside squads and vehicles, while the platoon leader supervised the search of the target. The level of detail disseminated throughout the

(Continued on page 40)

Photo by Sherlynn Borkgren

DEVELOPING AND MAINTAINING THE WARRIOR ETHOS IN ENGINEER UNITS

By Colonel Christopher W. Martin

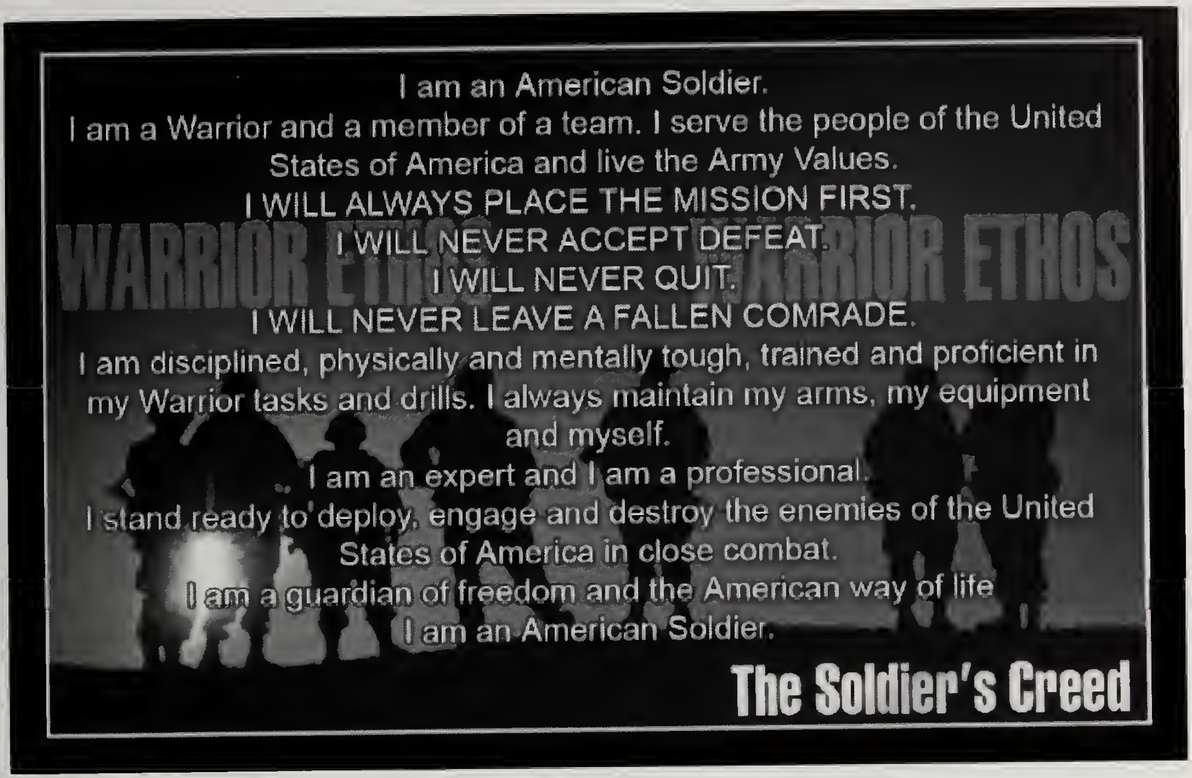
This article is aimed at helping company commanders and platoon leaders develop the Warrior Ethos in their units. It is based on things that worked for the 91st Engineer Battalion and ultimately led to the successful completion of a 14-month deployment in support of Operation Iraqi Freedom. Because of the way the battalion trained and the level of training reached, the brigade combat team commander had the confidence to let the unit fight as a task force in Baghdad. None of this happened overnight though; development of the Warrior Ethos began early and continued throughout the deployment.

As an Army, we talk about the "Warrior Ethos" or "Warrior Spirit" and how important it is for Soldiers and units to have this mindset to make them successful in combat. The Warrior Spirit takes on particular importance as units prepare to deploy and focus their training on the missions they anticipate once deployed. Units that don't make the development of a Warrior Spirit their priority are less likely to be successful in combat. Development of this ethos comes from discipline and training and is a continuous process, even when deployed. Units that develop and sustain a warrior mentality will find that their Soldiers are much more prepared mentally, physically, and emotionally to handle the rigors of continuous combat.

Training Warriors

It is our job as leaders to train and lead warriors. We must ensure that our units are ready to deploy anytime or anywhere and accomplish any mission. Even when a mission is not from a trained skill set, the mission must still be accomplished. Good units are able to accomplish any mission because they are disciplined, physically ready, and able to execute basic fundamental skills (blocking and tackling drills). They have leaders who have developed trust and confidence through hard, aggressive training.

Training is continuous, but ultimately begins and ends with noncommissioned officers (NCOs). In combat, NCOs must have the confidence to make decisions quickly; this ability and confidence is instilled during training. The commander's function is to guide NCOs and leaders in the unit to conduct the right training, under the right conditions, and according to standards. The commander (battalion, company, and platoon) is responsible for ensuring that NCOs know the standard and train to meet that standard. The commander arms his NCOs with the most valuable resource—adequate time to train. This is done by focusing on the tasks the unit will train on and determining what tasks will not be trained.



I am an American Soldier.
I am a Warrior and a member of a team. I serve the people of the United States of America and live the Army Values.
I WILL ALWAYS PLACE THE MISSION FIRST.
I WILL NEVER ACCEPT DEFEAT.
I WILL NEVER QUIT.
I WILL NEVER LEAVE A FALLEN COMRADE.
I am disciplined, physically and mentally tough, trained and proficient in my Warrior tasks and drills. I always maintain my arms, my equipment and myself.
I am an expert and I am a professional.
I stand ready to deploy, engage and destroy the enemies of the United States of America in close combat.
I am a guardian of freedom and the American way of life
I am an American Soldier.

The Soldier's Creed

Tasks

Commanders determine the skills and tasks Soldiers will train on—refinement of the mission-essential task list (METL) and battle tasks accomplishes this. Engineers typically have more "perceived" tasks and responsibilities than can possibly be trained and must determine what tasks should be trained. For instance, the likelihood of constructing an abatis or destroying a bridge is low, and therefore the 91st did not train on those tasks. They got more out of their training by focusing their squads and platoons on the most likely demolition missions they would receive: breach a lane through a minefield using hand-emplaced explosives, breach a lane through a wire obstacle, and breach a door or wall in a building. All demolitions training focused on performing these tasks. Once deployment orders were received for Operation Iraqi Freedom, the unit's METL was changed to include the tasks most likely to be executed in Iraq; those that were not anticipated were deleted.

Live-Fire Exercises

Probably the most important training conducted involved live-fire exercises (LFXs). Several LFXs were conducted at the squad and platoon levels, independent of the maneuver task forces, to give the Soldiers confidence in their weapon-handling abilities and their leaders confidence in coordinating and directing fires. LFXs also provide a valuable opportunity to train communication skills at the leader level. The 91st required the company commander to be present at the range and run the exercise for a squad-level LFX, and a field grade officer was required for all platoon-level LFXs. This allowed platoon leaders to communicate with squad leaders at squad-level LFXs and company commanders to work with platoon leaders at platoon-level LFXs.

LFX scenarios were based on combat, initially for the invasion into Iraq and later for the actual mission. Because the unit built the scenarios themselves, they had to understand Army Regulation 385-63, *Range Safety*. The principles outlined in this regulation carry over into combat and ensure that officers and NCOs have a good understanding of surface danger zones (SDZs) and weapons orientation.

The ability to clear a room or building is a task every combat engineer unit should master. It is a task that the 91st performed almost daily and often multiple times in a day. It is also a task that must be retrained constantly. Field Manual 3-06.11, *Combined Arms Operations in Urban Terrain*, explains how to perform the task properly, and commanders should coordinate with infantry units to help train leaders on this important battle drill. Every patrol and every Soldier that rolls off the forward operating base in Iraq, regardless of their military occupational specialty, stands the chance of making contact with the enemy and must be prepared to defeat the enemy through aggressive actions. Quite often, this will include clearing a building to kill or capture the enemy initiating the attack.

Weapons Training

The importance of weapons marksmanship and reflexive-fire training cannot be overemphasized. The confidence Soldiers develop in their weapon systems from constant shooting will be manifested when they are in a firefight.

Likewise, training on crew-served weapons and squad automatic weapons (SAWs) is vital, and proficiency on these weapons must be attained. There are other extremely useful means to train; for example, the Engagement Skills Trainer, which allows leaders to exercise rules of engagement (ROE) training is a great resource, if available.

Commanders should look for other unique capabilities their unit may require and find ways to train Soldiers on those tasks. A capability that builds confidence in units and in individual Soldiers is advanced marksmanship courses and sniper training. Snipers and excellent marksmen are invaluable in the urban environment and play an important role in many missions. The 91st trained snipers in each company down to platoon level. They were able to field an M14 sniper rifle in each line company, but had already purchased scopes for M16A2 rifles to develop platoon snipers. Even if it is not possible to field sniper rifles, the best shooters should be identified and sent to advanced marksmanship courses.

Combat Lifesaver Course

Another morale builder is the combat lifesaver (CLS) course. The battalion's standard for combat lifesavers is that every Soldier must be CLS-trained. The 91st held CLS courses weekly, even in Iraq, and Soldiers were recertified while deployed. Soldiers knew that if they were wounded while on a mission, their friends could take care of them (Level I care). In Iraq, CLS-trained Soldiers were vital to saving lives because they provided initial aid until the wounded Soldiers were medically evacuated to Level II care.

Equipment

Part of developing the Warrior Spirit is making Soldiers feel like warriors. One way to achieve this is to get the special equipment they need to conduct the mission. The Rapid Fielding Initiative goes a long way toward fulfilling that goal, but other pieces of equipment were recommended by Soldiers, such as door breaching kits, sniper scopes, spotlights and spotting scopes (for identification of improvised explosive devices [IEDs]), and collapsible ladders. Training on this equipment at Fort Hood, Texas, instilled confidence at the Soldier level prior to deployment. No matter how much equipment a unit buys, if Soldiers aren't trained on it, it doesn't matter. Mount M68s on weapons and train Soldiers to shoot with them. Learn how to use AN/PAS-13 Thermal Weapon Sights (TWS) before deployment. Enforce mounting all optics on weapons for every training event. The advantage over the enemy in Iraq using these weapon systems—fully-mounted with all optics—cannot be overstated.

Civilian Training

Get Soldiers the training they need to be successful, even if it is not available in the military. The 91st contracted with a civilian specialty school to ensure that their NCOs learned the correct standards and techniques for explosive breaching of a building. School personnel came to Fort Hood for a training session and trained 91st Soldiers using condemned apartments in a nearby community, and later the 91st sent several NCOs to attend the course at a civilian site. The morale of the NCOs who attended the course rose, and the battalion became expert at explosive breaching.

Training During Deployment

Good units continue to train even after they are deployed. Training should be focused on tactics, techniques, and procedures (TTP); lessons learned; and the fundamental skills needed for the unit to continue to be successful. Commanders should use this training to refine the lessons learned, develop methods to counteract the enemy's actions, and retrain areas identified as weaknesses in the unit. Again, continuous training improves Soldier morale and confidence.

Leaders should read and discuss after-action reviews and lessons-learned documents for the war in Iraq and Afghanistan and incorporate that information into training. It makes the training more relevant and gives Soldiers a sense of why they are doing the training. This is a baseline only, and things change.

Attitude

Not every aspect of developing the Warrior Spirit involves training. There is a psychological element also. If commanders constantly tell their Soldiers how good they are and how good their unit is, soon they will live up to that billing—if they are not already. Soldiers will have pride in their unit, and NCOs will develop a mindset that they can overcome any problem they face. Confidence developed in their capabilities will be manifested in their everyday attitude and actions. Soldiers cannot be trained for every contingency, but commanders can develop a Warrior Spirit in Soldiers that allows them to adapt to the situation and prevail.

Conclusion

As a commander, you should evaluate your unit and assess your progress in establishing the Warrior Spirit in your Soldiers. If it is not at the level you want, begin to instill it now. Be creative in your approach to training, and emphasize to your Soldiers why they are training a particular way. Try to build flexibility and an attitude that the unit can do anything, and you will not be disappointed.

Colonel Martin is currently a student at the United States Army War College. His previous assignments include Commander of the 91st Engineer Battalion for 36 months, as well as assignments in the United States Army Training and Doctrine Command (TRADOC), Southern European Task Force (SETAF), 1st Infantry Division, and the 101st Airborne Division.

JOINT ENGINEER OFFICER COURSE

By Mr. Robert B. McFarland, Jr.

"We continue to improve joint professional military education to provide more joint experiences, education and training to warfighters—junior and senior officers and noncommissioned officers. At the senior officer level, a modified capstone course will increase the emphasis on jointness while preparing senior officers to lead joint task forces and other joint operations. For junior officers and noncommissioned officers, incorporating joint education and training early in their careers ensures future leaders will more effectively integrate tactical operations with interagency and multinational components." (The National Military Strategy of the United States of America 2004, A Strategy for Today; A Vision for Tomorrow)

"Early planning efforts within the C-7 (engineer section) were hampered by a lack of knowledge of capabilities, requirements, and limitations of other service and coalition engineer forces, particularly among junior members of the staff. Action officers are often junior field grade or company grade officers who do not have sufficient joint engineer education or experience to be effective at the beginning of their assignment." (An after-action review comment from Operation Iraqi Freedom, Engineer, *January-March 2004,* "Joint Engineer Training, Joint Officer Education of the Future," *p. 19.)*

Engineer Capabilities Study

The final report of *The Engineer Capabilities Study: A Path to the Future*, 30 September 2002, identified that joint task force (JTF) engineer staffs are comprised of *several* 0-4 through 0-6 officers who may or may not have been exposed to joint professional military education (PME) and *many* 0-3s who have not. It further identified that most joint PME has little or no engineer content. Consequently, most officers assigned to JTF engineer staffs have little or no understanding of engineer capabilities outside of their own service and experience a steep learning curve before they are able to function effectively in a joint engineer environment. The report recommended that a 3- to 4-hour joint engineer orientation be presented at service engineer advanced courses (for senior 0-3s), followed by a Web-based, self-paced instruction program.

Proposal

The Joint Operational Engineering Board (JOEB) is the premier advisory group and proponent for operational engineering issues. Its charter is to oversee efforts to enhance joint engineer processes and capabilities to meet combatant commander's requirements. In an effort to address the JTF staff officer education issue, the board proposed a more formal joint officer education for the targeted engineer population. Joint education for officers already exists in limited amounts at engineer officer service schools, but there is no room for additional schooling without deleting other required subjects. The board's recommended solution was to establish a stand-alone course that would be more rigorous in its joint education and would better focus and prepare officers for assignment to a joint engineer staff. The proposed course is titled the *Joint Engineer Officer Course (JEOC)*.

Course Development

The JOEB assigned the JEOC development task to its Doctrine and Training Working Group. After extensive coordination and months of hard work, the working group and other key engineer personnel from all the services met at Fort Leonard Wood, Missouri, for a Training Developers Conference in the fall of 2005. At the conference, the combined efforts of the engineers resulted in a refined concept and course outline for the first JEOC pilot course that will be executed as a two-phase course in the spring and summer of 2006 at Fort Leonard Wood.

Distance Learning Phase

The 48-hour distance learning (DL) phase, which begins in March 2006, consists of eight modules with associated lessons that introduce students to—

- National security strategy development.
- Joint operations planning.
- Joint engineer capabilities.
- JTF engineer operations and planning.
- Engineer staff organizations and staff responsibilities within a combatant command.

Resident Phase

The 32-hour resident phase, scheduled for 19 – 23 June 2006, consists of eight seminars aligned with six practical exercises (PEs) (27 hours). The PEs are built around JTF scenarios that require students to develop and demonstrate an understanding of different service engineer capabilities and the common functions and responsibilities of a JTF engineer staff officer at the senior 0-3 and junior 0-4 grades. In addition, other PEs include—

- Task organizing engineer forces.
- Understanding the development and expectations of the engineer support plan.
- Understanding the Joint Engineer Planning and Execution System (JEPES).
- Understanding the JTF boards that an engineer staff officer is a member of.
- Understanding the functions and processes involved in financing, contracting, base camp development, and coordination with host nation and nongovernment organizations.

Upon completion of the JEOC, the student will be able to—

- Describe joint operations, joint warfare, and the joint planning system.
- Describe, comprehend, and apply joint engineer doctrine.
- Describe, comprehend, and apply joint engineer planning (to include the JEPES) by using scenarios, historical examples, case studies, and PEs.
- Describe and comprehend service engineer capabilities and support requirements, to include operating as part of a coalition.
- Describe, comprehend, and apply the strengths, effects, and basic doctrinal employment concepts of service engineers.
- Describe, comprehend, and apply employment principles for using service engineer capabilities in support of joint- and service-engineer requirements.

Goal

The JEOC is designed as a joint operations introductory course for junior leaders at the senior 0-3 and junior 0-4 levels, as well as for specified noncommissioned officers at the rank of senior E-7 through E-9 and others associated with joint engineer operations. The goal of the JEOC is to provide selected engineer officers with a basic understanding of the capabilities and organization of engineer forces of the U.S. military to better prepare them for duty on a staff in support of the JTF engineer and joint force commander. The course will provide enough grounding for students to understand the responsibilities of a staff officer assigned to the joint engineer staff section of a JTF. The major focus of the course is to introduce students to joint doctrine, planning and operations (specifically engineer operations), and the type of engineer staff positions and associated products engineers are required to develop.

Summary

The JEOC is a course designed by engineers for engineers. The pilot course will bring together engineers from all the services, who will test the lessons and materials for applicability in the current operational environment, as well as for future application to meet the challenges faced by engineer forces of the U.S. military in the 21st century. All engineers are strongly encouraged to monitor the progress of the JEOC as it develops and provide insight based on their personal experiences while working as a joint engineer staff officer.

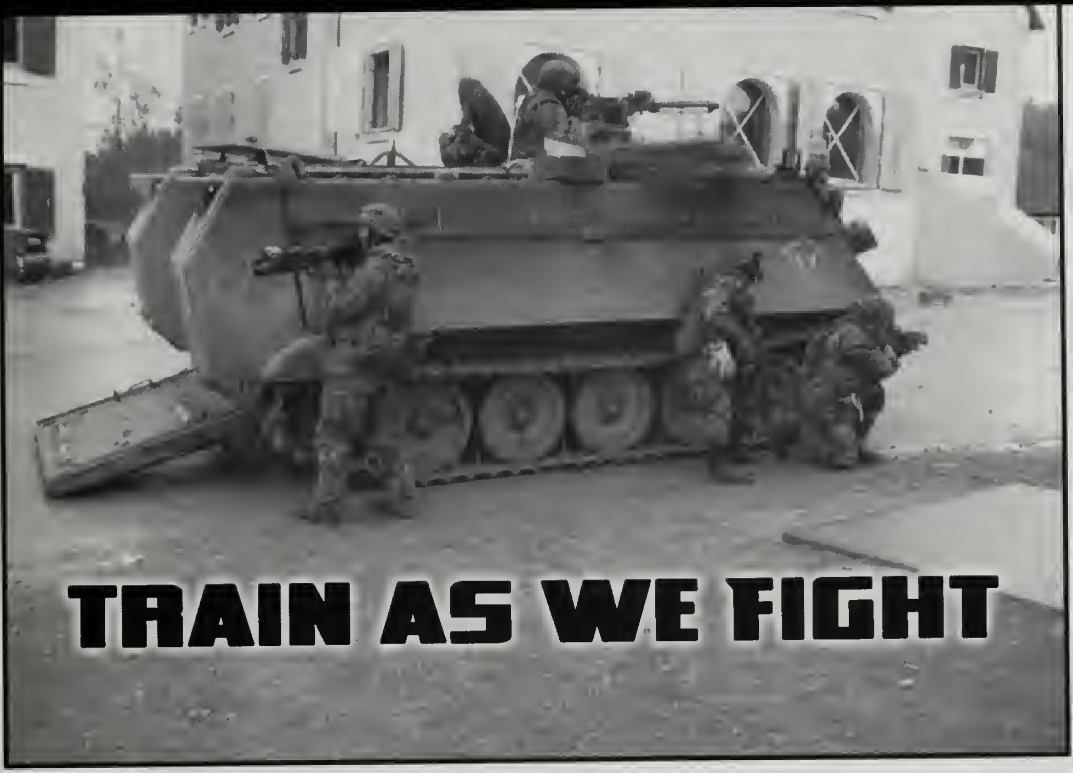
Questions or comments pertaining to the JOEC can be addressed to the Training Integration Office, United States Army Engineer School. The point of contact is *<robert.mcfarland@wood.army.mil>*, (573)-563-5402.

Mr. McFarland is a contractor working for C2 Technologies, Incorporated©, in the Training Integration Office of the United States Army Engineer School. He is the project manager for developing the Joint Engineer Officer Course concept, along with other ongoing joint efforts.

Dedication

The following members of the Engineer Regiment have been lost in the Global War on Terrorism since the last issue of *Engineer*, or were inadvertently omitted from a previous list. We dedicate this issue to them.

First Lieutenant Simon T. Cox, Jr.	1st Battalion, 66th Armor Regiment	Fort Hood, Texas
Specialist Dustin L. Kendall	1st Battalion, 68th Armor Regiment	Fort Carson, Colorado
Sergeant Monta S. Ruth	1st Battalion, 15th Infantry Regiment	Fort Benning, Georgia
Specialist Roberto L. Martinez Salazar	14th Engineer Battalion, 555th Maneuver Enhancement Brigade	Fort Lewis, Washington
Staff Sergeant Michael J. McMullen	243d Engineer Company	Baltimore, Maryland
Private First Class Thomas D. Caughman	391st Engineer Battalion	Spartanburg, South Carolina
Staff Sergeant Christopher R. Morningstar	562d Engineer Company, 172d Stryker Brigade Combat Team	Fort Wainwright, Alaska
Sergeant Jeremiah J. Boehmer	562d Engineer Company, 172d Stryker Brigade Combat Team	Fort Wainwright, Alaska



TRAIN AS WE FIGHT

By Captain Khang Ho

The Combat Maneuver Training Center (CMTC) at Hohenfels, Germany, underwent a transformation last year in an effort to better support the Global War on Terrorism. Now known as the Joint Multinational Readiness Center (JMRC), it welcomes the task of integrating our European allies in training exercises with U.S. forces. In an effort to improve its abilities as an expeditionary training center, it deployed observer-controller (OC) teams to Bulgaria and Romania to train their forces in side-by-side exercises with U.S. forces, hosted Czech and Polish forces in exercises at JMRC and various outlying German installations to conduct training with U.S. forces, and continues to provide quality multinational training geared to winning the war on terrorism.

Winning on the battlefield is what we do. As a company OC at JMRC, I have observed many sapper units going through training for deployment downrange. Sappers are trained and equipped with unique skills that support mobility, countermobility, survivability, and sustainment engineering missions. They are prepared to execute combat operations with traditional engineer tasks in an urban environment. When called on to fight as infantry, however, engineers must still be a force a commander can expect to augment with fire support. In view of the many activities being executed on today's asymmetric battlefield, we need to ensure that engineers aren't losing sight of the basic infantry skills that they have been called on to use in the past.

The operating environment engineers face today is an enemy employing classic insurgent tactics: ambushing troops on the roads with improvised explosive devices (IEDs), intimidating Iraqi security forces, assassinating Iraqi government officials, and terrorizing the population with random car bombings. Fighting these insurgents is, by its nature, small-unit engagements. Most sapper squads will engage in at least one random close-quarters firefight with suicidal fanatics armed with grenades and automatic weapons.

Sappers have no problem performing the engineer battle drills; however, they must be proficient in basic infantry skills as well. Whether it is IEDs, indirect fire, or direct-fire contact, sappers must know the basic battle drills so they can quickly and decisively fight through these engagements regardless of mission type.

While engineers contribute extensively toward achieving national goals as civic-action units, during combat operations engineers can be used in a secondary role as infantry. When a threat arises, engineers can be used as infantry on operational bases when all tactical units are committed or as reserves when the threat has caused the commitment of all available reserves.

Engineers conduct operations in an urban environment at the JMRC in preparation for their upcoming deployment.

Engineers use the "stack" technique at a door before entering and clearing a building.

For the most part, engineers are going to be fighting as a motorized infantry company downrange. Engineer companies can be expected to conduct urban combat operations such as cordon and searches, raids, combat patrols, and establishing traffic control point missions. These missions are complex and require dedicated planning and focused mission rehearsals before execution. Maneuver companies are often given opportunities to plan, rehearse, and execute these missions at JMRC when conducting an Operation Iraqi Freedom or Operation Enduring Freedom scenario, and it should be no different for an engineer company.

The task force must free itself from traditional, unit-specific jurisdictions and understand that engineer units require the same training if they are to fight as infantry. Cordon and search operations require detailed planning and rehearsals, using available forces and assets properly. Engineer leaders must be ready to plan and conduct these missions and must be able to convey to the task force commander what capabilities engineers bring to the fight. Engineers need the same training as the maneuver unit on stack drills, entering and clearing a building, and proper search and detainee handling procedures. Infantry and armor task forces would rather use their maneuver companies to perform the more difficult tasks rather than train the sappers to their fullest capabilities.

JMRC is effectively training units on the tactics, techniques, and procedures (TTP) that are being employed downrange in regard to IEDs. A state-of-the-art IED lane was built to give units the scenarios of IEDs employed in Iraq and Afghanistan. Engineers control most of the equipment in the Army for combating IEDs. The Buffalo is a great asset when it is used to confirm or deny suspected IEDs. As we have seen, IEDs have been, and will continue to be, the most dangerous and effective killer of coalition forces.

Task force commanders have to start looking at their sappers as one of their lethal forces on the battlefield and train them as such by giving them missions that will challenge their skills not only as engineers but also as a fighting force capable of locating and destroying the enemy. The doctrine and TTP that are being trained and honed at JMRC do work in combating IEDs and insurgent tactics and must be used correctly on the battlefield.

Engineer leaders must remind maneuver commanders of the need to increase security so we can do our missions. Much of the engineers' time is spent interfacing with the populace during civic action projects or conducting route reconnaissance to defeat IEDs. Although engineers can provide security, the full capabilities of engineers cannot be used if they are conducting security. Maneuver commanders should assign this mission to infantry or military police.

As engineer leaders, we must be able to sell to maneuver commanders what our capabilities are and how engineers can help the task force in winning the fight. We can conduct demolition, route reconnaissance, and route clearance operations; develop protective positions; and build field fortifications. Engineers can also assist the task force with basic environment infrastructure—sewage, water, electricity, academics, and trash (SWEAT) assessments. And last, but not least, engineers can fight as infantry.

Captain Ho is an observer-controller at the Joint Multinational Readiness Center in Hohenfels, Germany. Previous assignments include commander of an engineer company in Korea. He is a graduate of the Engineer Captain's Career Course.

BRIGADE ROUTE TRACKING AT JRTC

By Major Ted D. Yates

The safe, reliable, and secure operation of a surface transportation system within a brigade combat team's (BCT's) area of operations (AO) depends on collaboration and coordination across organizational boundaries. Units within or transiting across the BCT's AO need information to plan safe and predictable movement in terms of travel time while considering a host of variables that influence a route's condition.

Route tracking is a tool to help commanders and staffs plan movement times, route selection, adjustment of force protection measures, and prioritization of route reconnaissance and clearance efforts. The procedures for route tracking outlined in this article are not currently addressed in doctrine and portray a method of managing route information based on rotational unit practices at the Joint Readiness Training Center (JRTC) and unit products from Operation Iraqi Freedom.

Effective route tracking is a result of a nested process between units transiting the BCT's operational environment and the battalion and BCT staffs. The analytical capability of the staff at the BCT level can provide a regularly updated, single-source product to subordinate units and units traveling through the BCT's AO. Examples of unit and staff input are listed in Table 1. The "landowning" battalion task forces provide routine (time-driven) and event-driven reports to the BCT on the route status criteria concerning route capability, threat incidents, civil activities, and friendly activity within the battalion task force's AO to develop an accurate common operational picture of the brigade route status.

Route-tracking collection systems must provide timely, reliable, accurate, and relevant information, and they must be disseminated properly to be effective. Credibility is an extremely important consideration in properly implementing a route-tracking system. Regardless of how well a unit designs a tool, units will eventually distrust the system if it is not updated to reflect current conditions. Each time the information displayed is disproved, the credibility of the system decreases. Figure 1, page 22, shows a method of information flow of incidents and subsequent actions, and Table 2, page 22, shows a method of route-status distribution.

If possible, classify routes with the color-coded standard (Green, Amber, and Red) from checkpoint to checkpoint based on associated route status criteria. Additional reasons for route status (ongoing friendly operations, weather effects, construction, congestion, and threat incidents) can be displayed on the graphics with pertinent data such as rerouting criteria and related date-time groups.

Table 1. Unit and Staff Input Into Route Tracking

Element	Input
Units	Ongoing/future operations – patrols, cordon and searches, neighborhood engagement/development, traffic control points (TCPs), route capability, threat incidents, congestion due to random events (threat incidents, accidents, or breakdowns), impacts of recurring congestion due to daily/weekly cycle of events (work/market/religious) or religious/national observances, frequency of congestion (time periods, volume of traffic, and speeds of traffic along routes).
Brigade S-2	Threat incidents, predictive analysis/event template, and intelligence preparation of the battlefield.
Brigade S-3	Authority for raising and lowering route status and associated force protection measures, rerouting authority, monitoring units transiting through the BCT's AO, monitoring BCT asset movements, route clearance efforts, explosive ordnance disposal (EOD) operations.
Brigade Engineer	Overall staff proponent for route status tracking (a way); weather and terrain impacts; route capabilities; and monitoring planned construction, work zones, and closures.
Brigade S-4	Monitoring ongoing/future combat logistic patrol movements and requirements, monitoring contracted movements and coordinates, and monitoring echelon-above-brigade logistic movements within the BCT's AO.
Brigade Civil Affairs	Population traffic patterns and congested areas – market areas/times, anticipated demonstrations/rallies, displaced civilian patterns, pilgrimages, holidays or observances, school congestion times, nongovernmental organization movements.

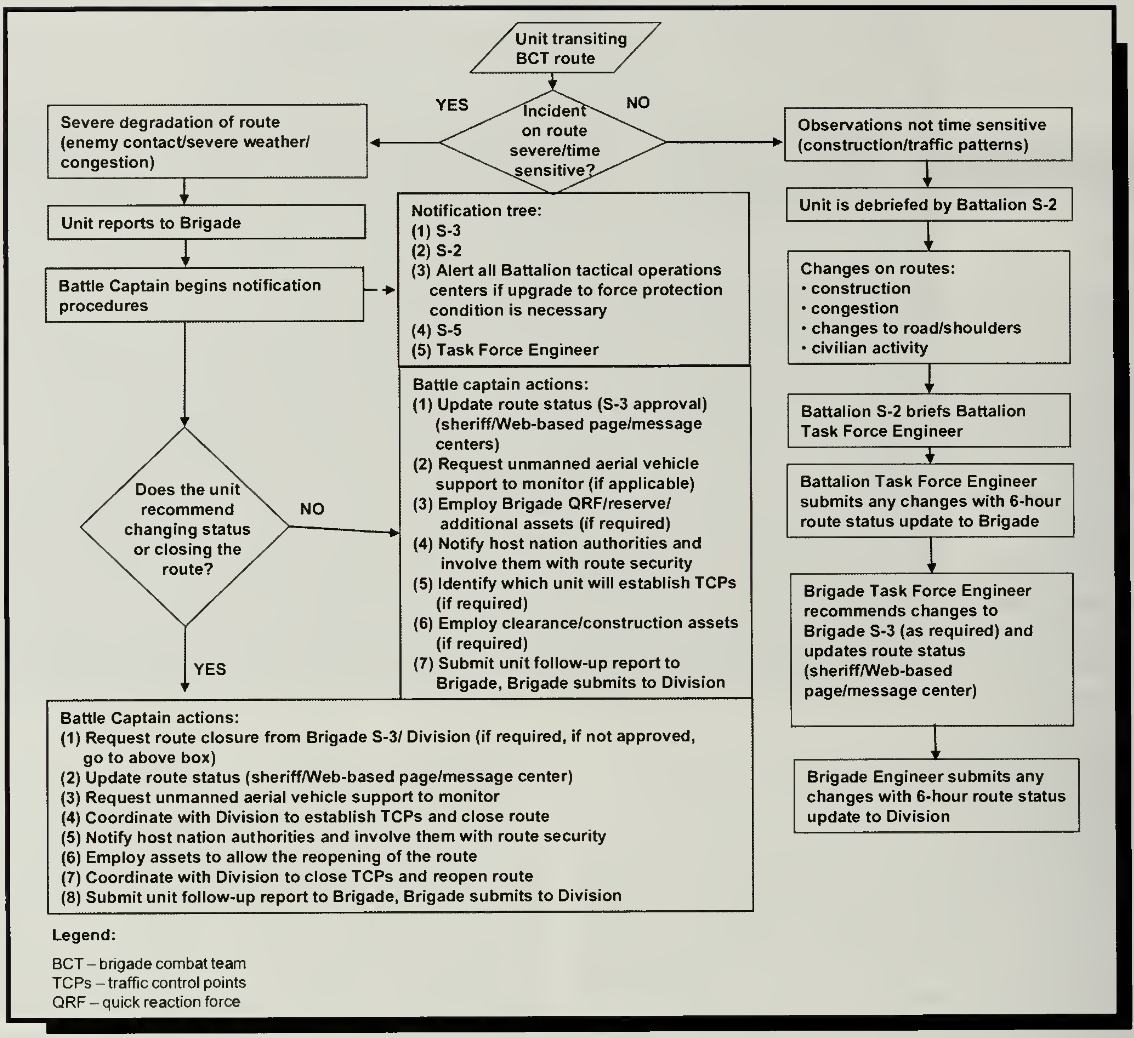

Unit transiting BCT route
Incident on route severe/time sensitive?
YES
NO
Severe degradation of route (enemy contact/severe weather/ congestion)
Unit reports to Brigade
Battle Captain begins notification procedures
Notification tree:
(1) S-3
(2) S-2
(3) Alert all Battalion tactical operations centers if upgrade to force protection condition is necessary
(4) S-5
(5) Task Force Engineer
Battle captain actions:
(1) Update route status (S-3 approval) (sheriff/Web-based page/message centers)
(2) Request unmanned aerial vehicle support to monitor (if applicable)
(3) Employ Brigade QRF/reserve/ additional assets (if required)
(4) Notify host nation authorities and involve them with route security
(5) Identify which unit will establish TCPs (if required)
(6) Employ clearance/construction assets (if required)
(7) Submit unit follow-up report to Brigade, Brigade submits to Division
Does the unit recommend changing status or closing the route?
NO
YES
Battle Captain actions:
(1) Request route closure from Brigade S-3/ Division (if required, if not approved, go to above box)
(2) Update route status (sheriff/Web-based page/message center)
(3) Request unmanned aerial vehicle support to monitor
(4) Coordinate with Division to establish TCPs and close route
(5) Notify host nation authorities and involve them with route security
(6) Employ assets to allow the reopening of the route
(7) Coordinate with Division to close TCPs and reopen route
(8) Submit unit follow-up report to Brigade, Brigade submits to Division
Observations not time sensitive (construction/traffic patterns)
Unit is debriefed by Battalion S-2
Changes on routes:
• construction
• congestion
• changes to road/shoulders
• civilian activity
Battalion S-2 briefs Battalion Task Force Engineer
Battalion Task Force Engineer submits any changes with 6-hour route status update to Brigade
Brigade Task Force Engineer recommends changes to Brigade S-3 (as required) and updates route status (sheriff/Web-based page/message center)
Brigade Engineer submits any changes with 6-hour route status update to Division
Legend:
BCT – brigade combat team
TCPs – traffic control points
QRF – quick reaction force

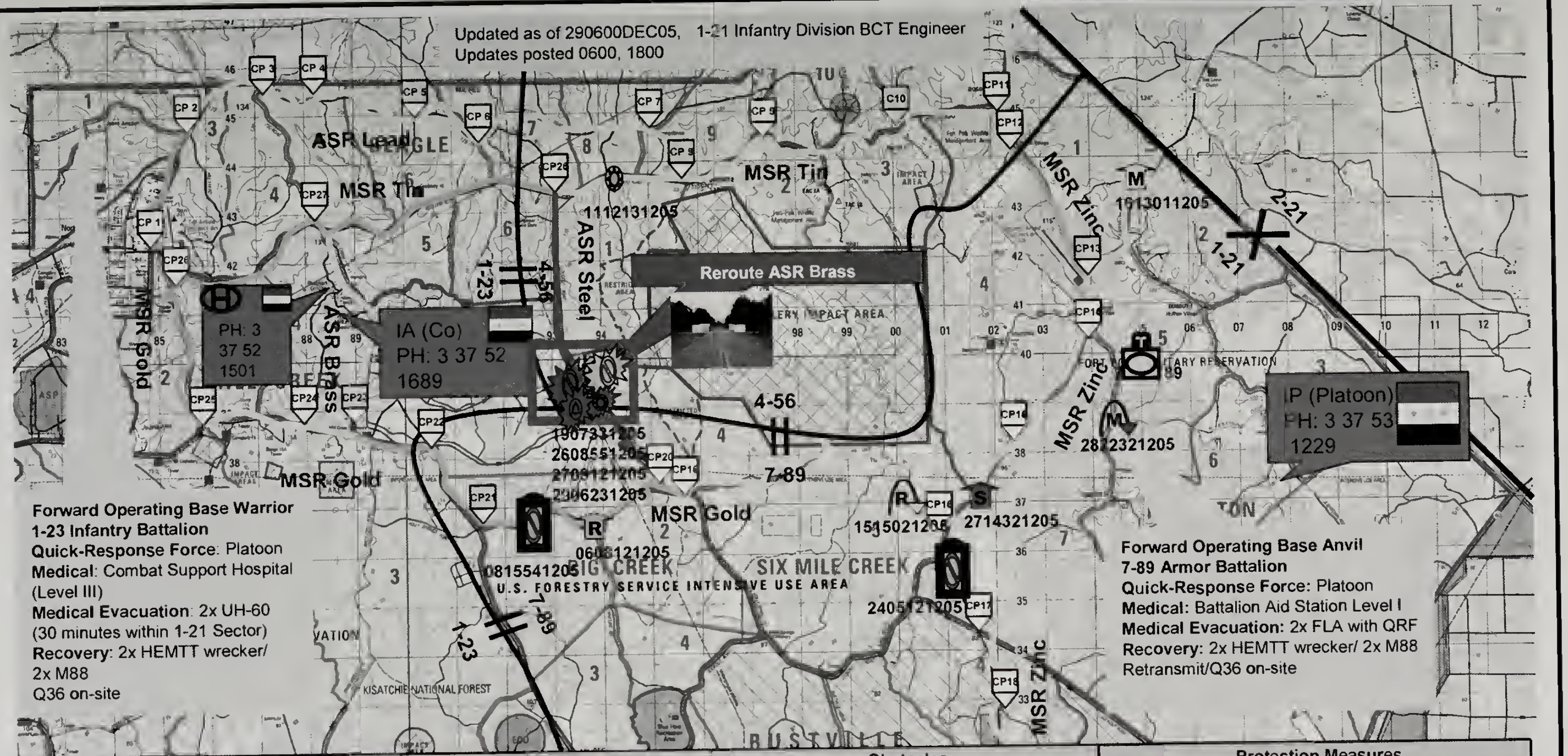
Figure 1. Sample Route-Tracking Information Flow Chart

Table 2. Methods of Route Status Distribution

Prior to Movement	During Movement
Blue Force Tracker/ Force XXI Battle Command Brigade and Below (FBCB2)	Blue Force Tracker/FBCB2
Convoy brief by staff	
Maneuver Control System-Light (MCS-L)	
Frequency modulation (FM) (sheriff network [NET])	FM (sheriff NET)
Telephone answering-machine message	Telephone answering-machine message
Message board at compound exit gate	
Web-based page	

In Figure 2, page 23, the route status criteria is limited to four areas (weather/congestion/trafficability, threat, obstacles, and protection measures) and addresses restrictions, constraints, and limitations of the routes and the units transiting them. It also prescribes how a unit can raise a route status through proactive measures; for example, conducting clearance operations or confirming a clear route.

This article reflects the practices of units training at JRTC and should not necessarily be construed as Army policy or doctrine. The intent is to provide commanders and staffs with



Updated as of 290600DEC05, 1-21 Infantry Division BCT Engineer
Updates posted 0600, 1800

Forward Operating Base Warrior
1-23 Infantry Battalion
Quick-Response Force: Platoon
Medical: Combat Support Hospital (Level III)
Medical Evacuation: 2x UH-60 (30 minutes within 1-21 Sector)
Recovery: 2x HEMTT wrecker/ 2x M88
Q36 on-site

Forward Operating Base Anvil
7-89 Armor Battalion
Quick-Response Force: Platoon
Medical: Battalion Aid Station Level I
Medical Evacuation: 2x FLA with QRF
Recovery: 2x HEMTT wrecker/ 2x M88
Retransmit/Q36 on-site

Standards	Weather/Congestion/Trafficability	Threat	Obstacles	Protection Measures
Green	No restrictions; all traffic capable above 60 kilometers per hour	IED unlikely; confirmed clear past 2 hours	Confirmed clear past 2 hours	3 vehicle minimum, 1 rifle per vehicle, 1 crew-served. 2x frequency modulation communications
Amber	Restricted capable up to 60 kilometers per hour; maintenance time < 24 hrs	IED activity probable; confirmed clear 2 < 6 hours	Mines/UXO marked and safe bypass exist	All from Green plus 4 vehicle minimum, 2x crew served, 1x Blue Force Tracker FBCB2
Red	Severely restricted capable up to 40 kilometers per hour; maintenance time > 24 hrs; NO HET, NO M870 trailer	IED activity imminent, clear last 6 < 12 hours	Mines/UXO identified and reported, not marked, safe bypass not identified	All from Amber plus no unarmored vehicle, minimum 2x dismounts per vehicle

Unit	Call Sign	CMD Freq	A/L	Sheriff / MEDEVAC / Retransmit
1-23 IN Bn	Raider	520	527	929 / 700 / 900
4-56 IN Bn	Coyote	620	627	929 / 700 / 900
7-89 AR BN	Rhino	720	727	929 / 700 / 900
TM Clear	Sapper	485	489	929 / 700 / 900

Yellow check points indicate Tactical Operations Center notification points for check in on cross boundary movement

IED Attack
IED Found

VBIED Attack
VBIED Found
Mine Strike
Mine Found
Indirect Rocket
Indirect Mortar

Legend
Small Arms
Rocket
Missile
Icon Colors
Current Week
Last Week
2 Weeks Ago
3 Weeks Ago

Area of Interest

Current Tier 1
Hot Spot (T1 Hour)

Legend:

AR – armor
ASR – alternate supply route
CP – check point
FBCB2 – Force XXI Battle Command Brigade and Below
FLA - field litter ambulance
HEMTT – heavy expanded-mobility tactical truck
HET – heavy equipment transporter
IA/IP - Iraqi army/Iraqi police
ID – infantry division
IED – improvised explosive device
IN – infantry
MEDEVAC – medical evacuation
MSR – main supply route
PH - phone
TM Clear - route clearance team
UXO – unexploded ordnance
VBIED – vehicle-borne improvised explosive device

Figure 2. Sample Route Tracker, Brigade Level

Figure 2 is an example of a single-source product which graphically portrays the BCT's AO route status common operational picture. The information allows the unit to—

- Determine main supply routes (MSRs) and alternate supply routes (ASRs), with check points, using the map with an overlay.
- Identify (ID) boundaries for landowners and check-in point for cross boundary movement.
- ID telephone numbers, command frequency, and administrative and logistics frequencies with command post call signs for landowners.
- ID recent threat incidents (within 30 days) with possible analysis—for example, indicators of increased threat and possible route alternatives (timing, dispersion, alternate routes). Often this will use callouts with images for better resolution.
- ID locations of compounds/forward operating bases (FOBs), police stations, host nation or coalition military compounds, and other significant friendly organizations with security capabilities.
- ID locations of coalition medical facilities/aid stations (generally on compounds/FOBs).
- ID aerial medical evacuation (MEDEVAC) capabilities (frequency, call sign, and general response time).
- ID friendly quick-reaction force (QRF) and maintenance recovery capabilities (generally, type of unit, base camp, and size).
- ID guard or sheriff frequency.
- ID if there is a route security element—for example, a military police unit or artillery unit—in addition to a landowner (should be identified with frequency and call sign).

a tool to examine an existing route-tracking system or initiate a new system. There are numerous methods, techniques, and criteria that can be employed to evaluate and disseminate route status. If you have "best practices" concerning route tracking or any other aspects of assured mobility that would prove valuable for units preparing for deployment, please contact the JRTC Brigade Command and Control Engineer Team at <*ted.yates@polk.army.mil*>.

Major Yates is a brigade engineer observer-controller at the Joint Readiness Training Center. Previous assignments include assistant engineer plans officer for Combined Joint Task Force (CJTF)-76 in Afghanistan. He holds a bachelor's in history from Georgia Southern University.

("Combat Support Brigade," continued from page 12)

Army, while the remainder will be spread throughout the Army National Guard and United States Army Reserves. The first four units will be activated in fiscal year 2006.

The formulation of this new unit will require two major adjustments in the philosophy of training. The first is in the development of the senior leadership through progressive education and experience. The ability to command and control a multifunctional unit demands the development of new skills to coordinate multiple functions into an integrated execution plan. The second is the development of the collective skills within the headquarters to produce a coordinated and integrated understanding of the multiple functions on the tactical and operational environment of the future.

The United States Army Maneuver Support Center (MANSCEN) is currently designing the training plans and materiel to support the formulation of the new headquarters.

Summary

The deployment of the newly created CSB (ME) will provide a valuable and capable element to the Future Force. The brigade will provide support to the committed BCTs; perform missions in its own area of operations to support the offense, the defense, or stability operations; and support the division and corps rear areas with essential control functions.

Mr. Miller is the director of Fort Leonard Wood operations for TecMasters, Inc. A retired lieutenant colonel, he holds a bachelor's in business administration and a master's in management from California Polytechnic University, Pomona.

Mr. Draker is a combat experimentation analyst with the MANSCEN Futures Center, Maneuver Support Integration Division, and is engaged in the development of concepts, organization, and doctrine for the CSB (ME). A retired lieutenant colonel, he holds a master's in logistics management and a master's in business administration from Florida Institute of Technology.

Troop-Leading Procedures Planning Process

By Captain Brian LaMarca

Upon returning to the base camp after patrolling in western Baghdad, the company commander is directed to report immediately to the task force tactical operations center (TOC), where he is briefed that he will be executing a company raid with an attached Special Forces team at an unknown address in less than 6 hours. By the time the commander departs the TOC, he has about 5 hours to plan, coordinate, and execute this mission based on very vague intelligence.

This situation happened to me in my third month of command and—for the first time—tested the planning process I used to develop effective and expedient troop-leading procedures. As a battalion planner and company commander, I saw three approaches used to tackle the planning process:

- *Centralized planning*—dictating information down to assigning individual vehicle positions and sectors of fire.
- *Cooperative planning*—gathering the platoon leaders together and deciding, as a unit, how the company would fight.
- *Framework planning*—issuing a clear intent and the task and purpose for each element and relying on platoon-level planning to round out the plan.

Centralized Planning

With centralized planning, the commander lays out his intent with specific instructions—down to squad and vehicle level—for items such as movement order, positions on the objective, and sectors of fire.

Advantages

The clarity of this method leaves very little room for platoon leaders to question or determine how they will maneuver and makes maximum use of the commander's experience in employing his assets.

Disadvantages

One of the disadvantages of centralized planning is the amount of time required for the company to develop its very detailed operation order (OPORD) and graphics. Any delay in

A Soldier updates the commander after completing a mission.

Effective planning ensured the success of any type of mission, even this route security mission in western Baghdad.

the completion of the OPORD quickly devours the time available for the platoons to conduct their troop-leading procedures. This becomes a serious concern when operating on a compressed timeline.

Another disadvantage is that the commander has the sole responsibility for providing this information, and the planning process comes to a halt if he is unable to dedicate time to completing the OPORD. In continuous operations, frequent distractions (such as enemy contact in sector) demand the commander's attention. While platoon leaders could attempt to develop their own maneuver plans—based on the commander's intent—their planning process would take much longer due to their lack of experience.

This method takes too long and takes too much flexibility from the platoons, which seriously hinders executing short-notice missions.

Cooperative Planning

Cooperative planning consists of the commander and platoon leaders, beginning at the receipt of the mission, collectively deciding on the best way for the company to fight.

Advantages

This provides the benefit of many eyes looking at the same problem and coming up with a variety of plans. Since the platoon leaders are being asked to conduct higher-level planning (which can be a positive development experience for them), each plan is scrutinized for its validity.

Another advantage is that using this method often results in the platoon leaders' ownership of the mission plan immediately, as the completed OPORD has their input incorporated.

Disadvantages

The disadvantage of cooperative planning is that producing the company OPORD takes longer since it is developed by a committee. As with centralized planning, it impacts by decreasing the time allowed for platoon troop-leading procedures. The process requires platoon leaders to be present for both company and platoon OPORD development, meaning that the platoon leaders are not available to respond to continuous operations demands encountered once company-level planning has begun.

This method proved the least effective of the three because it required so much leadership time—company and platoon—that it seriously limited the company's flexibility to work several missions at once. Just as with centralized planning, commanders can use other tools to receive platoon leader input instead of this time-consuming method.

Framework Planning

With this planning method, the commander focuses on ensuring that the company OPORD includes a clear intent and the task and purpose for each platoon. He then relies on platoon leaders to develop major portions of their maneuver within the OPORD. The commander uses checks during the remainder of the preparation time to ensure that the intent is met.

Advantages

A major advantage of this method is that it enables platoon leaders to learn how to quickly and effectively plan their missions. This leads to improved overall planning—from company-level operations to daily combat patrols—because the platoon leaders learn what details must be considered for successful operations. Framework planning allows platoon leaders to provide their input, giving them a major role in the planning process.

Soldiers prepare a terrain model for an upcoming platoon OPORD.

Also, with this method, it takes less time to produce a company OPORD. The commander provides the necessary details for platoon planning and issues it to the platoon leaders for refinement. This allows platoon leaders a greater amount of time for their troop-leading procedures and allows the commander time for additional contingency planning on any issues the company could face during execution.

Disadvantages

Framework planning, however, does initially take some time. If the platoon leaders are not accustomed to maneuver planning, the commander checks may take longer. Fortunately, this is an issue that can be dealt with through training, allowing the platoon leaders to gain the experience to make this second nature.

Key Elements of Framework Planning

One consideration when using this method is that it requires commanders to pay special attention to key elements of the troop-leading procedures, such as issuing a clear OPORD, requiring effective backbriefs, ensuring quality rehearsals, and conducting after-action reviews (AARs).

Operation Order

For framework planning to be successful, commanders must focus specifically on a few aspects of the company OPORD. The first of these is the commander's intent. As a lieutenant, typically the intent statements received included generic key tasks, such as "reporting," "sensitive-items accountability," or "information operations." My company found that in order to make the intent useful to platoon leaders, more specific key tasks, such as "silent dismounted approach to reduce enemy reaction time" or "rapid exfiltration off the objective to reduce the mortar threat" were essential to make it clear how the commander wanted to fight.

When issuing tasks to subordinate units, using doctrinal terms proved essential in clearly conveying what missions the platoon leaders need to address. While this may require some training for the new platoon leaders, sticking to the doctrinal terms made the planning process faster by preventing confusion.

While platoon leaders have an important role in determining their platoon's maneuver, the commander must still include important coordinating instructions, such as restricted fire lines, recognition markers, movement techniques, and any other mission-specific instructions. This helps prevent fratricide and ensures that platoon leaders keep their plans within the commander's guidelines.

Finally, the commander provides the essential maps and graphics to conduct their planning. Typically, we included a FalconView™ satellite photo with graphics and a sketch. While the platoon leaders have an important part in the planning process, the company still owes some details to ensure that platoons have everything they need to complete their planning.

Backbriefs

After issuing the OPORD, the commander must conduct checks with the platoon leaders to ensure that they are on the right track. The most helpful check for me was the platoon backbriefs, where we ensured that the company had a solid, refined plan. Prior to the backbrief, the platoon leaders will have already issued their first warning order (WARNO) and completed their OPORD planning. During the backbrief, platoons talk through the details of their actions throughout the operation and add their platoon graphics to the company sketch.

"Framework planning allows platoon leaders to provide their input, giving them a major role in the planning process."

For raiding a building, they discussed details such as specific vehicle positions, combat power dedicated to clearing each floor, sectors of fire and task organization of each element, and platoon timelines. While the commander will already have an idea of how he would fight each platoon, a platoon leader may provide a slightly different outlook on how to complete the mission. The commander can use his intent, as well as his experience, to determine whether the platoon leader's plan is valid. This is an excellent training opportunity, even during a deployment, for platoon leaders to understand why certain tactics are preferred in a given situation.

Additionally, the backbrief presents an opportunity for platoon leaders to propose changes to the company OPORD. This gives the commander the luxury of having more than one person find potential solutions to the same problem and leads to a more solid plan. Even if the commander denies a change, it forces him to validate the logic behind each aspect of his plan as he explains his decision to the platoon leader. With the platoon leaders hearing each other's plans, it helps them understand everyone's part in the execution of the mission and how their platoon's fight must tie into the other platoons' maneuver.

Finally, by adding each platoon's graphics to the company sketch, it ensures that each platoon has common graphics before leaving. Our company found that a solid backbrief validates the company OPORD and prevents major issues from arising in the company rehearsals.

Rehearsals

Traditional rehearsals serve as the next check. For platoon level and below, walk-through rehearsals proved to be the most effective method. At company level, however, we found that a walk-through rehearsal often made it difficult for squad leaders to see and/or hear the plans of the other platoons' squads. A map rehearsal for squad leaders and above allows the company commander to ensure that the squad leaders' understanding of their squad and platoon missions parallel his own understanding. And it allows for additional input from the squad level on any improvements to specific details within the plan.

At the rehearsal, the company provides a copy of the completed sketch from the backbrief to each squad leader, and then has each squad leader explain his part in the execution of each phase. The sketch and explanations ensure that every company leader—down to squad leader level—has a common understanding of the upcoming mission. Quality platoon and company rehearsals definitely paid off in ensuring a smooth execution.

After-Action Reviews

The last key element to framework planning is to conduct an AAR, which will ensure that future mission plans are conducted faster and executed smoother. Initially, I only required leaders from the platoons involved in the mission to attend; however, we learned through experience that platoons without representatives at the AAR would repeat the mistakes that had been addressed at the previous AAR. I then required each platoon to have a representative at every company AAR, regardless of whether they participated in the mission or not. This allowed platoons to learn from each other's mistakes and successes.

Additionally, the AAR allowed leaders at all levels to bring up details that had not been addressed prior to executing the mission. This identified—to the platoon leaders and myself—what else should be addressed in the OPORDs to prevent confusion on future missions. The company's ability to honestly evaluate its own performance and identify areas for improvement allowed it to improve both its planning and execution on following missions.

Summary

Centralized planning ensures that the commander's intent is met, but it presents problems when faced with a compressed timeline. Cooperative planning develops a unified plan, but requires a great amount of leader time. Framework planning provides the mission intent with a task and purpose for each element and relies on platoon-level planning, which proved to be the most effective method for this company commander and company.

When presented with the mission of conducting a raid with Special Forces in a few hours, I was able to quickly provide the OPORD to the platoon leaders. As they conducted their platoon planning, I finalized coordination with external assets and received a thorough backbrief with 4 of the 5 hours still available for rehearsals and final preparations.

This short-notice operation captured terrorists and a cache of weapons, explosives, and ammunition. It also provided intelligence that led to additional related targets, which we executed in the coming weeks. Preparing for this mission was demanding; however, framework planning provided us time to effectively plan, coordinate, and execute the mission with confidence.

Captain LaMarca's assignments include battalion planner for the 91st Engineer Battalion and company commander for Charlie Company, 91st Engineer Battalion, and Echo Company, 1st Battalion, 8th Cavalry. In Iraq, his company executed raids, as well as constructed protective obstacles around polling centers prior to the Iraq election. Upon returning to the United States, he was deployed to New Orleans to assist with the Hurricane Katrina relief efforts.

ENGINEER DOCTRINE UPDATE

By Lieutenant Colonel Edward R. Lefler and Mr. Les R. Hell

This article provides an update to the Engineer Regiment on doctrinal publications. Significant content changes due to lessons learned from recent operations, the transition to a modular force, and changes in joint and Army capstone and keystone manuals are being worked. The old 5-series manuals will be modified to a new 3-34.*xyz* system that complements the Army and joint hierarchies.

Value of Doctrine

Doctrine touches all aspects of the Army. It links theory, history, experimentation, and practice. It provides an authoritative statement about how military forces do business, insights and wisdom gained from collective experience with warfare, and a common language to describe it. It is a guide to action, not "hard-and-fast" rules. Doctrine provides the intellectual tools leaders use to solve military problems quickly and effectively. By establishing common ways of accomplishing military tasks, it helps standardize operations and enhance readiness. Doctrine facilitates clear thinking and assists a commander in determining the proper course of action during the decision-making process. It facilitates communication among Soldiers and contributes to a shared professional culture. It forms the basis for curricula in the Army education system.

Effective doctrine for all levels explains how Soldiers and leaders expect to fight and operate. It is based on experience—an estimate of what lies ahead. Doctrine provides fundamental principles by which military forces and their elements guide their actions in support of national objectives. It is authoritative, but requires judgment in application.

Principles, Tactics, Techniques, and Procedures

Doctrine includes fundamental principles, tactics, techniques, and procedures. *Principles* form the basis that guide the actions of Army forces in support of national objectives. They provide the foundation for initiatives designed to help leaders be adaptive, creative problem solvers. *Tactics* address the employment of units in combat. The actual application of tactics is highly circumstantial; it is both art and science. Tactics vary constantly with the situation. *Techniques* are the general and detailed methods used by troops and commanders to perform assigned missions and functions, specifically the methods of using equipment and personnel. *Procedures* are standard and detailed courses of action that describe how to perform a task. Techniques and procedures are the lowest level of doctrine. They are specific to particular types of units based on organization, equipment, and environment.

Capstone Field Manuals

The Army has two capstone field manuals (FMs)—FM 1, *The Army*, and FM 3-0, *Operations*—that form the apex of the Army's doctrine hierarchy. Together, they establish the framework for a range of supporting doctrine. Army keystone doctrine is organized around foundations established in FM 3-0. Supporting manuals provide additional detail for keystone manuals.

FM 3-0 establishes the Army's fundamental principles for applying land power as part of an interdependent joint force. It provides a framework for action and decision making at all levels. It is not meant to be, and must not be, a substitute for thought. The aim is to establish guidelines for leaders to direct operations while allowing enough freedom for bold, creative initiative in any situation.

Engineer Doctrine

The Engineer Regiment has 59 field manuals in its library (the second largest number of any proponent organization in the Army). Of these, 4 are current; 35 require assessment for relevancy, accuracy, and content; and the remaining 20 are under revision or require revision. Our keystone manual that supports the Army's hierarchy is FM 3-34, *Engineer Operations*. The remaining 58 engineer field manuals are subordinate to FM 3-34.

As the Army embraces more technology in its units, there must be ways to make rapid changes in doctrine that will accommodate changes in hardware, software, and procedures. The process of developing Army doctrine is a decentralized operation that involves the collective and cooperative effort of a large number of proponent schools and centers and targeted subject matter experts (SMEs). Our objective is to achieve total integration of engineer doctrine with Army proponent schools and centers, as well as with multiservice, joint, and allied doctrine. We strive to ensure that our doctrine has credibility and legitimacy because it is developed with the "user" in the "field Army" in mind. This is achieved through extensive staffing, targeted SMEs, Army schools and centers, and joint partners.

Key Developmental Issues

For doctrine to be effective, it must be consistent and applicable at all levels and in all environments. Engineer doctrinal revisions address and incorporate all applicable new or revised joint and Army capstone and keystone publications, the current operational environment, new technology, new materiel, new organizations, lessons learned, and validated concepts. There have been many emerging and key developmental issues to address in engineer doctrine. Following are some primary ones of immediate concern:

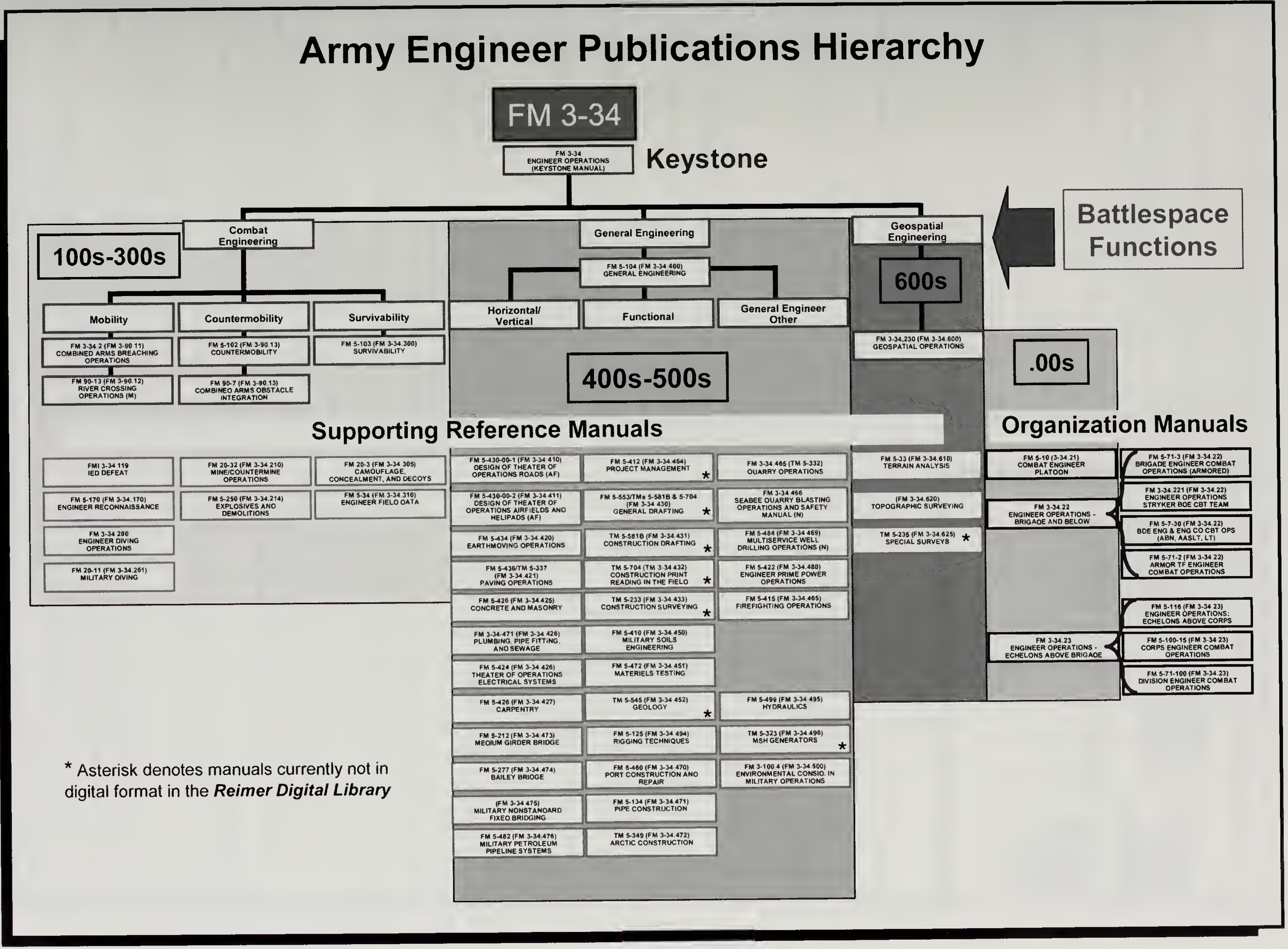
- Defining the Future Engineer Force (FEF) capabilities and organizations. Augmentation at brigade combat team level for engineer support (engineer battalion headquarters, mobility operations) and maneuver support is needed.
- Updating existing improvised explosive device (IED) doctrine with rapidly changing tactics, techniques, and procedures, and incorporating the right lessons learned, new materiel, and training.
- Transitioning the Army away from the battlefield operating systems to the more joint-aligned warfighting functions (WFF). Mobility and countermobility universal tasks are proposed with movement and maneuver WFF. Survivability universal tasks are aligned with the protection WFF. General engineering is a subtask of the sustainment and logistics WFF. Geospatial engineering is aligned with the intelligence WFF.
- Defining maneuver support and integrating it in Army keystone and capstone doctrine.
- Defining and embedding infrastructure reconnaissance throughout engineer and Army doctrine.
- Defining base camp standards and coming to an agreement between all services on one standard.
- Reintegrating the five functional areas (conduct combined arms breaching, conduct clearing, conduct gap crossing, construct and maintain combat roads and trails) of mobility operations back into doctrine.
- Defining the types of gap crossings (deliberate, hasty, and covert) and establishing the linkage between gap crossing and mobility operations.
- Revising our approach to engineer reconnaissance to a more combined arms approach with better resolution on the differences between the tactical and technical reconnaissance, discussing engineer reconnaissance teams, explaining and highlighting reachback and other technical augmentation, reintroducing a discussion on tunnel reconnaissance, and adding infrastructure and environmental reconnaissance (assessment and survey) into publications.
- Redefining essential mobility and survivability tasks to essential maneuver support tasks to synchronize and integrate more than just mobility and survivability operations.
- Defining and detailing clearing operations (route and area) in doctrine.
- Defining and detailing search operations in doctrine.
- Assessing and updating current information on urban explosive breaching and bringing our procedures in line with the United States Marine Corps.
- Redefining and establishing a consistent obstacle numbering system. If done correctly, the relationship between the North Atlantic Treaty Organization (NATO); American, British, Canadian, and Australian (ABCA); and U. S. standards can be complementary.

Numbering and Hierarchy

Figure 1 shows the basic hierarchy of engineer manuals with the revised numbering system. FM 3-34 and its eight subordinate manuals directly relate to and support engineer battlespace functions (combat engineering [mobility, countermobility, and survivability], general engineering, and geospatial engineering), coupled with the organizational and supporting reference manuals.

In August 1997, the United States Army Training and Doctrine Command (TRADOC) initiated a program to revise the Army doctrine hierarchy to link it by function and number to the joint publication system. This resulted in a tiered systematic approach that delineates between Army capstone and keystone doctrine and aligns those manuals with their corresponding joint manuals. The remaining manuals consist of proponent and branch-specific doctrine and publications. While the revised numbering system was approved and is in place at some levels of the Army, implementation has been a slow process. The renumbering of older manuals will occur during the normal revision cycle.

Figure 2, page 32, is an example of the originally planned transition to the new numbering system—a detailed resolution for each manual. However, due to the dynamics of the ever-changing environment, it was determined that a simplified version would better serve the Regiment. As manuals are updated, the FM 3-34.*xyz* numbering system will be used for the majority of the manuals, not the example shown in Figure 2. The 100- to 300-level series manuals will be linked to combat engineering functions, the 400- to 500-level series manuals will be linked to general engineering functions, and the 600-level series manuals will be linked to geospatial engineering functions. The organizational manuals will be



Army Engineer Publications Hierarchy

FM 3-34
FM 3-34 ENGINEER OPERATIONS (KEYSTONE MANUAL)
Keystone
Battlespace Functions
Combat Engineering
100s-300s
Mobility
Countermobility
Survivability
FM 3-34 2 (FM 3-90 11) COMBINED ARMS BREACHING OPERATIONS
FM 90-13 (FM 3-90.12) RIVER CROSSING OPERATIONS (M)
FM 5-102 (FM 3-90.13) COUNTERMOBILITY
FM 90-7 (FM 3-90.13) COMBINED ARMS OBSTACLE INTEGRATION
FM 5-103 (FM 3-34.300) SURVIVABILITY
General Engineering
FM 5-104 (FM 3-34 400) GENERAL ENGINEERING
Horizontal/ Vertical
Functional
General Engineer Other
400s-500s
Geospatial Engineering
600s
FM 3-34.230 (FM 3-34 600) GEOSPATIAL OPERATIONS
.00s
Supporting Reference Manuals
FMI 3-34 119 IED DEFEAT
FM 5-170 (FM 3-34.170) ENGINEER RECONNAISSANCE
FM 3-34 280 ENGINEER DIVING OPERATIONS
FM 20-11 (FM 3-34.261) MILITARY DIVING
FM 20-32 (FM 3-34 210) MINE/COUNTERMINE OPERATIONS
FM 5-250 (FM 3-34.214) EXPLOSIVES AND DEMOLITIONS
FM 20-3 (FM 3-34 305) CAMOUFLAGE, CONCEALMENT, AND DECOYS
FM 5-34 (FM 3-34 310) ENGINEER FIELD DATA
FM 5-430-00-1 (FM 3-34 410) DESIGN OF THEATER OF OPERATIONS ROADS (AF)
FM 5-430-00-2 (FM 3-34 411) DESIGN OF THEATER OF OPERATIONS AIRFIELDS AND HELIPADS (AF)
FM 5-434 (FM 3-34 420) EARTHMOVING OPERATIONS
FM 5-436/TM 5-337 (FM 3-34.421) PAVING OPERATIONS
FM 5-426 (FM 3-34.425) CONCRETE AND MASONRY
FM 3-34-471 (FM 3-34 426) PLUMBING, PIPE FITTING, AND SEWAGE
FM 5-424 (FM 3-34 426) THEATER OF OPERATIONS ELECTRICAL SYSTEMS
FM 5-426 (FM 3-34 427) CARPENTRY
FM 5-212 (FM 3-34 473) MEDIUM GIRDER BRIDGE
FM 5-277 (FM 3-34.474) BAILEY BRIDGE
(FM 3-34 475) MILITARY NONSTANDARD FIXED BRIDGING
FM 5-482 (FM 3-34 476) MILITARY PETROLEUM PIPELINE SYSTEMS
FM 5-412 (FM 3-34 464) PROJECT MANAGEMENT *
FM 5-553/TMs 5-581B & 5-704 (FM 3-34 430) GENERAL DRAFTING *
TM 5-581B (FM 3-34.431) CONSTRUCTION DRAFTING *
TM 5-704 (TM 3-34 432) CONSTRUCTION PRINT READING IN THE FIELD *
TM 5-233 (FM 3-34 433) CONSTRUCTION SURVEYING *
FM 5-410 (FM 3-34 450) MILITARY SOILS ENGINEERING
FM 5-472 (FM 3-34 451) MATERIELS TESTING
TM 5-545 (FM 3-34 452) GEOLOGY *
FM 5-125 (FM 3-34 494) RIGGING TECHNIQUES
FM 6-460 (FM 3-34 470) PORT CONSTRUCTION AND REPAIR
FM 5-134 (FM 3-34 471) PIPE CONSTRUCTION
TM 5-349 (FM 3-34.472) ARCTIC CONSTRUCTION
FM 3-34.465 (TM 5-332) QUARRY OPERATIONS
FM 3-34 466 SEABEE QUARRY BLASTING OPERATIONS AND SAFETY MANUAL (N)
FM 5-484 (FM 3-34 469) MULTISERVICE WELL DRILLING OPERATIONS (N)
FM 5-422 (FM 3-34.480) ENGINEER PRIME POWER OPERATIONS
FM 5-415 (FM 3-34.465) FIREFIGHTING OPERATIONS
FM 5-499 (FM 3-34 495) HYDRAULICS
TM 5-323 (FM 3-34 496) MSH GENERATORS *
FM 3-100 4 (FM 3-34 500) ENVIRONMENTAL CONSID. IN MILITARY OPERATIONS
FM 5-33 (FM 3-34.610) TERRAIN ANALYSIS
(FM 3-34.620) TOPOGRAPHIC SURVEYING
TM 5-235 (FM 3-34.625) SPECIAL SURVEYS *
Organization Manuals
FM 5-10 (3-34.21) COMBAT ENGINEER PLATOON
FM 3-34.22 ENGINEER OPERATIONS - BRIGADE AND BELOW
FM 3-34.23 ENGINEER OPERATIONS - ECHELONS ABOVE BRIGADE
FM 5-71-3 (FM 3-34.22) BRIGADE ENGINEER COMBAT OPERATIONS (ARMORED)
FM 3-34.221 (FM 3-34.22) ENGINEER OPERATIONS STRYKER BDE CBT TEAM
FM 5-7-30 (FM 3-34.22) BDE ENG & ENG CO CBT OPS (ABN, AASLT, LT)
FM 5-71-2 (FM 3-34 22) ARMOR TF ENGINEER COMBAT OPERATIONS
FM 5-116 (FM 3-34 23) ENGINEER OPERATIONS: ECHELONS ABOVE CORPS
FM 5-100-15 (FM 3-34 23) CORPS ENGINEER COMBAT OPERATIONS
FM 5-71-100 (FM 3-34.23) DIVISION ENGINEER COMBAT OPERATIONS

* Asterisk denotes manuals currently not in digital format in the ***Reimer Digital Library***

Figure 1

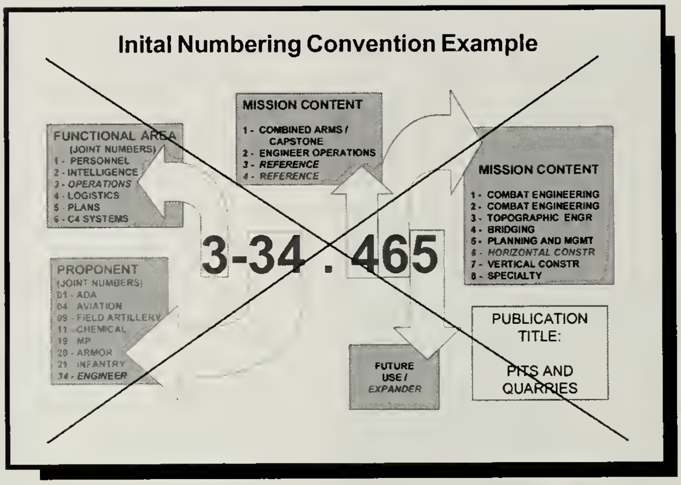


Figure 2

renumbered to 3-34.*xy*, and many of our key manuals that directly relate to combined arms will be renumbered to FM 3-90.*xy* (such as FM 3-90.11, *Combined Arms Mobility Operations*; FM 3-90.12, *Combined Arms Gap Crossing Operations*; and FM 3-90.13, *Combined Arms Obstacle Integration*).

Recently published manuals using this new numbering system are—

- Field Manual Interim (FMI) 3-34.119, *IED Defeat*, September 2005.
- FM 3-34.221, *Engineer Operations - Stryker Brigade Combat Team*, January 2005.

Ongoing and Near-Term Doctrine Actions

Doctrinally, as you can see, the Regiment and the Army as a whole have a lot on their plate. Engineer manuals currently being updated are listed in the following paragraphs, along with the ongoing integration efforts with Army and joint publications (JPs).

Currently 14 publications are being revised in support of the Global War on Terrorism and the modular transformation. Primary changes relate to the key developmental issues already mentioned. In Figure 3, those 14 publications are highlighted in the boxes outlined in red. A full-color copy of Figure 3 is posted to the United States Army Engineer School, Doctrine Development Division, Web site at <*http://www.wood.army.mil/DDD*>. (Select "US Army Engineer Doctrine Manual.")

Engineer Publications

- FM 3-90.11 (currently FM 3-34.2), *Combined Arms Mobility Operations*.

  Status: Final draft.

  Revision highlights: FEF modularity, mobility (breaching, clearing, gap crossing, combat roads and trails, forward aviation combat engineering [FACE]), IEDs, WFF; maneuver support, urban breaching, and essential maneuver support tasks.

- FM 3-90.12 (currently FM 90-13), *Combined Arms Gap Crossing Operations*.

  Status: Adjudicating the comments from the initial draft staffing to the field.

  Revision highlights: FEF modularity, reconnaissance, gap crossing definitions, WFF, and maneuver support.

- FM 3-90.13 (currently FM 90-7), *Combined Arms Obstacle Integration*.

  Status: Final draft.

  Revision highlights: Obstacle numbering, FEF modularity, WFF, and maneuver support.

- FM 3-34, *Engineer Operations*.

  Status: Initiating process to revise.

  Revision highlights: FEF modularity, WFF, maneuver support, alignment to capstone doctrine, assured mobility, and essential maneuver support tasks.

- FM 3-34.22 (currently FM 3-34.221, FM 5-71-2, FM 5-71-3, and FM 5-7-30), *Engineer Operations - Brigade Combat Team and Below.*

  Status: Writing the initial draft.

  Revision highlights: FEF modularity, WFF, essential maneuver support tasks, and assured mobility.

- FM 3-34.300 (currently FM 5-103), *Survivability.*

  Status: Final draft.

  Revision highlights: Protection, hardening, WFF, and essential maneuver support tasks.

- FM 3-34.170 (currently FM 5-170), *Engineer Reconnaissance.*

  Status: Writing the initial draft.

  Revision highlights: Infrastructure reconnaissance (assessment and survey), environmental reconnaissance (assessment and survey), and engineer reconnaissance teams and reachback.

- FM 3-34.210 (currently FM 20-32), *Explosive Hazards Operations.*

  Status: Editing the final approved draft.

  Revision highlights: Explosive hazards, explosive ordnance clearance agents, search operations, IED operations, clearance operations, landmine policy, and mine dogs.

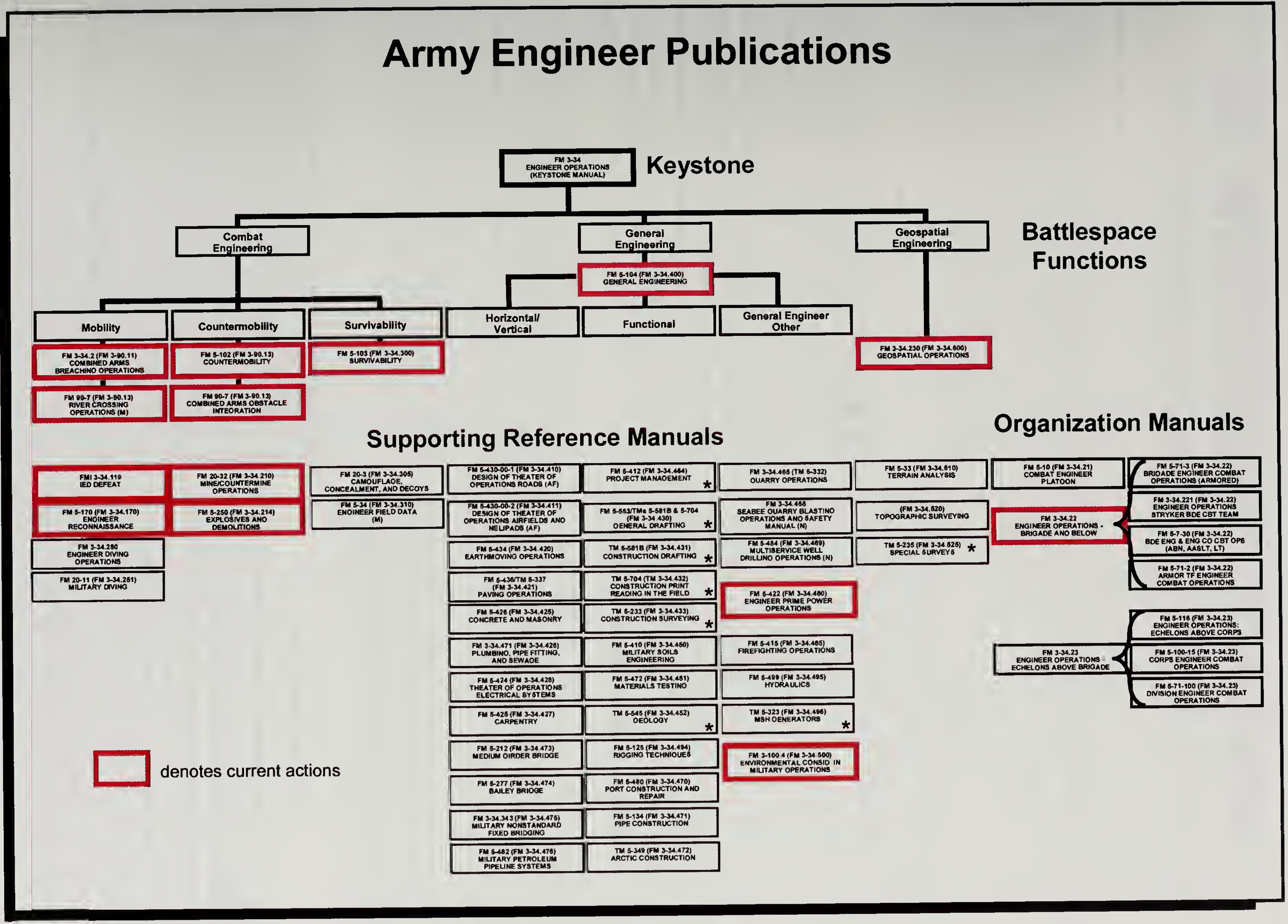
- FM 3-34.400 (currently FM 5-104), *General Engineering.*

  Status: Final draft.

  Revision highlights: Infrastructure reconnaissance, FEF modularity, homeland support, reachback, and WFF.

- FM 3-34.214 (currently FM 5-250), *Explosives and Demolitions.*

  Status: All final draft comments are adjudicated; preparing the final approved draft.


Army Engineer Publications
FM 3-34 ENGINEER OPERATIONS (KEYSTONE MANUAL)
Keystone
Combat Engineering
General Engineering
Geospatial Engineering
Battlespace Functions
FM 5-104 (FM 3-34.400) GENERAL ENGINEERING
Mobility
Countermobility
Survivability
Horizontal/ Vertical
Functional
General Engineer Other
FM 3-34.2 (FM 3-90.11) COMBINED ARMS BREACHING OPERATIONS
FM 5-102 (FM 3-90.13) COUNTERMOBILITY
FM 5-103 (FM 3-34.300) SURVIVABILITY
FM 3-34.230 (FM 3-34.600) GEOSPATIAL OPERATIONS
FM 90-7 (FM 3-90.13) RIVER CROSSING OPERATIONS (M)
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FM 5-250 (FM 3-34.214) EXPLOSIVES AND DEMOLITIONS
FM 3-34.280 ENGINEER DIVING OPERATIONS
FM 20-11 (FM 3-34.251) MILITARY DIVING
FM 20-3 (FM 3-34.305) CAMOUFLAGE, CONCEALMENT, AND DECOYS
FM 5-34 (FM 3-34.310) ENGINEER FIELD DATA (M)
FM 5-430-00-1 (FM 3-34.410) DESIGN OF THEATER OF OPERATIONS ROADS (AF)
FM 5-430-00-2 (FM 3-34.411) DESIGN OF THEATER OF OPERATIONS AIRFIELDS AND HELIPADS (AF)
FM 5-434 (FM 3-34.420) EARTHMOVING OPERATIONS
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FM 3-34.471 (FM 3-34.426) PLUMBING, PIPE FITTING, AND SEWAGE
FM 5-424 (FM 3-34.428) THEATER OF OPERATIONS ELECTRICAL SYSTEMS
FM 5-425 (FM 3-34.427) CARPENTRY
FM 5-212 (FM 3-34.473) MEDIUM GIRDER BRIDGE
FM 5-277 (FM 3-34.474) BAILEY BRIDGE
FM 3-34.343 (FM 3-34.475) MILITARY NONSTANDARD FIXED BRIDGING
FM 5-482 (FM 3-34.476) MILITARY PETROLEUM PIPELINE SYSTEMS
FM 5-412 (FM 3-34.464) PROJECT MANAGEMENT *
FM 5-553/TMs 5-581B & 5-704 (FM 3-34.430) GENERAL DRAFTING *
TM 5-581B (FM 3-34.431) CONSTRUCTION DRAFTING *
TM 5-704 (TM 3-34.432) CONSTRUCTION PRINT READING IN THE FIELD *
TM 5-233 (FM 3-34.433) CONSTRUCTION SURVEYING *
FM 5-410 (FM 3-34.450) MILITARY SOILS ENGINEERING
FM 5-472 (FM 3-34.451) MATERIALS TESTING
TM 5-545 (FM 3-34.452) GEOLOGY *
FM 5-125 (FM 3-34.494) RIGGING TECHNIQUES
FM 5-480 (FM 3-34.470) PORT CONSTRUCTION AND REPAIR
FM 5-134 (FM 3-34.471) PIPE CONSTRUCTION
TM 5-349 (FM 3-34.472) ARCTIC CONSTRUCTION
FM 3-34.465 (TM 5-332) QUARRY OPERATIONS
FM 3-34.468 SEABEE QUARRY BLASTING OPERATIONS AND SAFETY MANUAL (N)
FM 5-484 (FM 3-34.469) MULTISERVICE WELL DRILLING OPERATIONS (N)
FM 5-422 (FM 3-34.480) ENGINEER PRIME POWER OPERATIONS
FM 5-415 (FM 3-34.485) FIREFIGHTING OPERATIONS
FM 5-499 (FM 3-34.495) HYDRAULICS
TM 5-323 (FM 3-34.496) MSH GENERATORS *
FM 3-100.4 (FM 3-34.500) ENVIRONMENTAL CONSID IN MILITARY OPERATIONS
FM 5-33 (FM 3-34.610) TERRAIN ANALYSIS
(FM 3-34.520) TOPOGRAPHIC SURVEYING
TM 5-235 (FM 3-34.525) SPECIAL SURVEYS *
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FM 5-71-3 (FM 3-34.22) BRIGADE ENGINEER COMBAT OPERATIONS (ARMORED)
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FM 5-71-2 (FM 3-34.22) ARMOR TF ENGINEER COMBAT OPERATIONS
FM 5-116 (FM 3-34.23) ENGINEER OPERATIONS: ECHELONS ABOVE CORPS
FM 5-100-15 (FM 3-34.23) CORPS ENGINEER COMBAT OPERATIONS
FM 5-71-100 (FM 3-34.23) DIVISION ENGINEER COMBAT OPERATIONS
denotes current actions

Figure 3

Revision highlights: Urban breaching, neutralization terminology, and modernized demolition initiators.

- FM 3-34.480 (FM 5-422), *Engineer Prime Power Operations.*

  Status: All final draft comments are adjudicated; preparing the final approved draft.

  Revision highlights: Equipment and capabilities.

Related Army Publications

- FM 3-0, *Operations.*

  Status: Writing initial draft.
- FMI 5-0.1, *The Operations Process.*

  Status: Completed February 2006 and posted to the Army Knowledge Online (AKO) Web site.
- FMI 3-91, *Division Operations.*

  Status: Preparing the final approved draft.

Joint Publications

- JP 3-0, *Joint Operations.*

  Status: Final coordination of draft adjudication.
- JP 3-34, *Joint Doctrine for Engineer Operations.*

  Status: Writing revision second draft.
- JP 3-15, *Joint Doctrine for Barriers, Obstacles, and Mine Warfare.*

  Status: Writing Army engineer input to revision first draft.
- JP 2-03, *Geospatial Intelligence Support to Joint Operations.*

  Status: Revision second draft in adjudication.
- *Joint Forward Operations Base Force Protection Handbook.*

  Status: Final draft edition for the quick-reaction test; starting process to integrate into an Air, Land, Sea Application (ALSA) multiservice tactics, techniques, and procedures publication through the Joint Allied Doctrine Division analysis and approval.

Regiment Involvement

As previously mentioned, keeping a diverse and large inventory of manuals current requires effort from across the Regiment to ensure that the engineer library is maintained, relevant, and pertinent. What good is it to have a manual on *Arctic Construction* when it is not used, current (it was written in 1962), or relevant? Surely there have been numerous advances in arctic construction in the last 40 years.

Maintaining our doctrinal library is critical to the Regiment because it integrates engineer doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). It is our training base for educating Soldiers and officers, as well as a ready reference while deployed and performing missions that might not be routine. Numerous efforts are ongoing throughout the Regiment. The Engineer School challenges you to participate in the doctrine development process to produce relevant and current doctrine for our Regiment. Drafts are staffed through the AKO portal (sergeant first class and above and major and above). If you would like to become involved in the process, or if you have unique expertise that would make you the perfect SME candidate, contact the Engineer School Doctrine Development Division at <*http://www.wood.army.mil/DDD*> or call commercial, 573-563-7332/8161; or DSN, 676-7332/8161.

Conclusion

While many initiatives are in the works to change the way we write, produce, and access Army doctrine, there is still a need to manage, review, and update existing manuals to ensure that they are relevant and valuable to our Regiment. We must continue to integrate current engineer changes into existing and new manuals. Participation in the doctrine development process—by targeting SMEs and working groups drafting these documents with key engineer and maneuver-supporting perspective—is essential. With your help, the process will meet the doctrinal needs of the Regiment and the Future Force by maintaining a relevant, current, consistent, and integrated library.

Lieutenant Colonel Lefler is the Chief of the Doctrine Development Division at the United States Army Engineer School, Fort Leonard Wood, Missouri. He is a registered professional engineer in Nebraska and a Project Management Professional.

Mr. Hell is the Deputy Chief of the Doctrine Development Division at the United States Army Engineer School, Fort Leonard Wood, Missouri.

If you would like to become involved in the doctrine development process, contact the Engineer School Doctrine Development Division at <*http://www.wood.army.mil/DDD*> or call commercial, 573-563-7332/8161; or DSN, 676-7332/8161.

IED AWARENESS TRAINING:

ARE WE PREPARING OUR JUNIOR LEADERS FOR SUCCESS?

By Captain Therese L. Obidinski

As the Senior Engineer Instructor for the Combined Arms Division, Fort Sill, Oklahoma, I teach Field Artillery Officer Basic Course (FAOBC) students and serve as the 30th Field Artillery Regiment's improvised explosive device (IED) subject matter expert. My mission is to advise the commander on the status of IED training and resources for the Captain's Career Course (CCC), Officer Basic Course (OBC), Basic Officer Leadership Course (BOLC), and Warrant Officer Course.

After much research on the ever-changing environment of IEDs, one crucial question was raised: Are we really preparing our junior leaders for success when they arrive at their unit, and ultimately, when they deploy? This is a rather broad question; part of the solution lies in adapting to tactics, techniques, and procedures used by the enemy and another part on training a brand new second lieutenant—who already has a rucksack overflowing with mandated basic branch program of instruction requirements—on this prolific subject. To answer this question, we had to consider another approach that focused on the purpose of FAOBC and the critical IED information that should be taught at the student level with available time and resources.

The initial focus started with the purpose and scope of FAOBC. At first, the answer seemed simple. These students are not here to be engineer or armor officers. They are here to be field artillery officers, and their mission is to understand the role of the fire support officer (FSO) and how that role relates as a member of the combined arms team. These junior leaders will learn how to support the maneuver commander. However, they also will learn that despite their primary responsibility as an FSO, they could be directed to lead a security patrol, run a checkpoint, or even provide security in a convoy.

As these junior leaders participate in these other missions, they will encounter IEDs. According to a *Stars and Stripes* article dated 7 December 2005, as of 26 November 2005, IEDs caused approximately 39 percent of the 2,100 U.S. fatalities in Iraq. That's 821 Soldiers. The same article also stated that IEDs, along with other explosive devices, were responsible for about 50 percent of U.S. hostile deaths in Iraq, and explosive devices accounted for 8,452 of the U.S. troops wounded in Iraq—about 53 percent of the total number of hostile-fire wounds.

Unfortunately, the casualty statistics—and the enemy's methods—change every day; it is difficult to keep abreast of every change. If you browse Web sites dedicated to the fallen in Iraq, not only do you see the list of names but also the large number of officers and especially junior officers listed among the fallen. With the 19-week training cycle for OBC and 7-week training cycle for BOLC II, one may ask: How do we prepare these junior leaders for the challenges that face them, and what tasks should we train?

Training

The United States Army Field Artillery School has focused resources on the new Field Manual Interim (FMI) 3-34.119, *IED Defeat*, dated September 2005, and the new Convoy Survivability Training Support Package (TSP), which outline IED collective and individual training tasks. BOLC II training on the Convoy Survivability TSP started in January 2006 and centers around two tasks: *Identify Visual Indicators of an IED* and *React to an IED.*

There are 14 tasks to train, and each task has its associated subtask. The challenge of IED training appears daunting at first. However, it is manageable, and we as leaders must focus on targeted training. We can't train everything in a school environment. These officers will receive more in-depth training when they transition to BOLC II and unit-specific training when they arrive at their follow-on assignment. Schoolhouse instructors can play a larger role in assisting commanders in the field if we train lieutenants more on basic IED tasks and provide officers with a more logical, methodological approach when identifying, assessing, and reacting to IEDs. This involves communication with leaders on the ground through tools such as open discussion forums <*www.companycommand.com*>, the secure Internet protocol router network (SIPRNET), the Center for Army Lessons Learned (CALL), and other feedback mechanisms to determine what leaders expect from lieutenants when they arrive at their units and, specifically, what level of IED awareness training we can train here from shared real-world experiences.

Resources

The United States Army Engineer School at Fort Leonard Wood, Missouri, is the proponent for IED training and procurement. The primary training support centers (TSCs) responsible for producing training aids are Fort Gordon, Georgia; Fort Jackson, South Carolina; Fort Knox, Kentucky; Fort Benning, Georgia; and Fort Lewis, Washington (regional). The Fort Sill TSC provides resources and training aids to Oklahoma (all counties), Arkansas (all counties), and Texas (all counties north of Wichita Falls). Just as the Fort Sill TSC supports other units outside of its installation, other TSCs have their area of responsibility. Training aids are assigned on a priority basis, usually going to units that have upcoming deployments. Coordination for training aids can be facilitated through local TSCs. It is there to support training and will do the necessary requisition or coordination for the training aids and devices required.

Although there are IED training aids available, many private contractors bid for Army contracts to develop new training aids to keep pace with the contemporary operating environment. The United States Army Program Executive Office for Simulation, Training, and Instrumentation (PEO-STRI) is responsible for developing and fielding new training devices and systems.

The figure below shows the new Tactical Improvised Explosive Device 2 (TIED2) kit, an interim solution that is being fielded across the force to assist units with realistic training. The kit simulates the basic components of an IED, with a remote-controlled device and a radio-frequency transmitter. The system uses talcum powder to achieve a smoke-like signature effect. Compressed carbon dioxide (CO2) in tanks—the same concept as a paintball gun—is used to simulate the effects of a roadside bomb and other types of IEDs, each with its own unique signature effects.

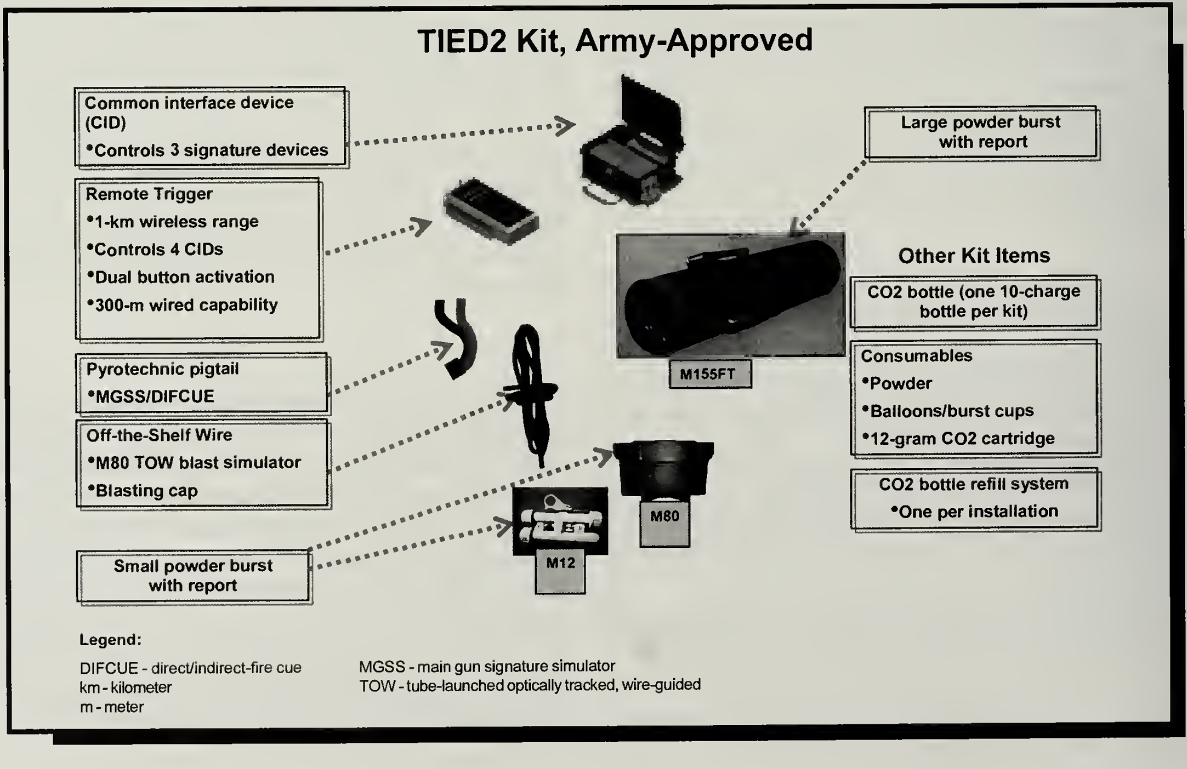
Another system developed at Fort Leonard Wood is the IED Effects Simulation (IEDES) Kit. The United States Army Training and Doctrine Command (TRADOC) validated the requirement, and the requirements document is being staffed at Department of the Army for funding in the 08-13 Program Objective Memorandum. IEDES provides a realistic training capability using different configurations of small, medium, large, and extra large munitions effects. The overall intent of the system is to help Soldiers and leaders plan, prepare, and react to IED effects.

It is important for all leaders and trainers to have a basic understanding of the TSC request process and to distinguish between Army-approved versus non-Army-approved systems. Trainers need to identify resource requirements early and submit requests through S-3 channels to consolidate and track requests. Higher headquarters should coordinate through local TSCs for requests. If training aids, devices, simulators, and simulations (TADSS) are purchased using Operations and Maintenance, Army (OMA) funds, they have to be supported using OMA funds throughout their life cycle. In other words, if you purchase items through a vendor directly, you will drain your own unit funds for restocking those items. If items are not ordered through the Army system, the Army has no record that there is a need for specific training aids. Therefore, the Army will not authorize the unit additional items (they are not on the property books), restock those items and, most importantly, units will not be funded by the Army for those items.

Currently PEO-STRI is fielding the TIED 2 (interim solution) on an Army Training Support Command-approved distribution plan. TIED 2 was designed to meet a specific need to bridge the gap in planning, preparing, and reacting to IEDs in a specific operational theater. At this time, the only validated and approved TADSS is the IEDES. If units procure any other devices, it is done at their expense. In addition, using devices that are not validated and approved is seriously risking the safety of the Soldiers conducting the training.

Implementation

Currently, the Field Artillery School is involved in preparing a block of instruction on IED awareness training across the Regiment. This training will be


TIED2 Kit, Army-Approved

inserted in a field environment where it does not distract from mandated basic branch requirements. FAOBC students currently receive IED awareness training that draws upon real-world examples. We are also in the process of developing a plan to integrate and evaluate this training through situational training exercises during the FAOBC fires and effects capstone field training exercises. BOLC II instruction will evaluate IED training during convoy survivability operations and forward operating base exercises (FOBEXs).

Conclusion

The integration of IED awareness training—determining where to insert classes and revising and evaluating training—is an ongoing process. The enemy's determination to use IEDs remains strong, and the methods are constantly evolving. If we can teach these junior officers basic methodologies, critical thinking, and the basics of identifying, assessing, and reacting to the IED threat, then we are preparing them for success, no matter what the task. According to the 2005 *Army Strategic Planning Guidance*, "Operation Iraqi Freedom and Operation Enduring Freedom have shown that insurgencies can arise out of regime change and can hinder follow-on stability operations. The current enemy has adopted asymmetric strategies and tactics that enable it to mitigate U.S. strengths. U.S. forces must adapt to the new strategic environment and develop proficiencies that counter these tactics."

It is important to provide junior leaders with the tools to adapt and to counter these asymmetric strategies and tactics in a nonthreatening environment, saving valuable training time when they arrive at their follow-on assignments. The time we dedicate to IED and leader training here at the Field Artillery School will help to familiarize junior leaders with the many challenges they will face in theater and in their military career. Focusing on leader development and critical thinking skills will provide the Army and the nation with more adaptive and responsive leaders at all levels.

Captain Obidinski is assigned to the 1-30th Field Artillery Regiment, Fort Sill, Oklahoma, and is the Senior Engineer Instructor, Combined Arms Division. Previous assignments include Commander, D Company, 3d Battalion, 10th Infantry Regiment, Fort Leonard Wood, Missouri, and Commander, HHC (P), Warrior Brigade, Fort Polk, Louisiana. She holds a bachelor's from the United States Military Academy at West Point and a master's in geology and geophysics from the University of Missouri-Rolla.

AISI Maintenance: Check the Batteries

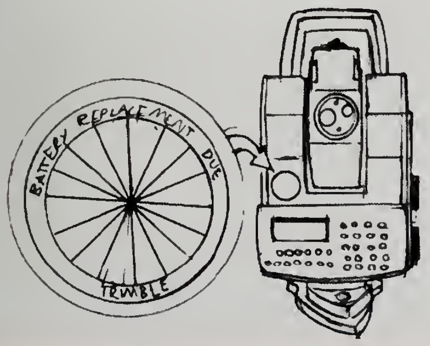
By Mr. Danny A. Carter

Some engineer units are finding after they deploy that their automated integrated surveying instruments (AISIs) aren't working right because the batteries need to be replaced. Don't let that happen to you! Survey the batteries on all of your AISIs to see if their internal batteries have been replaced in the last three years. If not, the batteries need to be replaced. There are two ways to check:

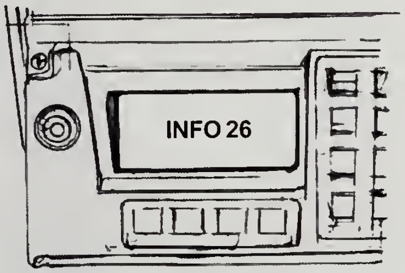
- Look at the Trimble Battery replacement due date sticker just below the distance meter head.
- Turn the power on and look for INFO 26 in the display. If it is, then the batteries need to be replaced as soon as possible. If you continue to operate the AISI in an INFO 26 condition or with expired batteries, you risk total loss of the AISI's memory or AISI failure.

You can't replace the batteries yourself. An authorized service center must do it. To get instructions and approval for AISI battery replacement, contact the Communications-Electronics Command at DSN 987-5472 or commercial (732) 427-5472; e-mail <*danny.carter@mail1.monmouth.army.mil*>; or DSN 992-9982 or commercial (732) 532-9982, e-mail <*hilda.thomas@mail1.monmouth.army.mil*>. They will need the serial numbers of your AISIs.

Look at replacement due date sticker...



...or check for INFO 26 in the display



Training Joint Engineers for Deployment

By Lieutenant Colonel John C. McClellan

In the past year of the nation's ongoing Global War on Terrorism, United States Air Force personnel have been called on more and more to deploy to overseas billets in support of United States Army ground forces in Iraq and Afghanistan. These positions include numerous engineer specialties such as explosive ordnance disposal (EOD), engineer design teams, utility teams, and firefighters.

In order to prepare these joint fighters for the complex, dangerous ground combat environment in both Iraq and Afghanistan, the 2d Brigade, 91st Division (Training Support) (2-91st TSB), conducts the Army's 3-week Combat Skills Training (CST) course at Fort Carson, Colorado. The 1st Battalion, 361st Engineer Regiment (Task Force Redhawk), is currently executing its 15th CST rotation, training another group of deploying Air Force personnel how to *shoot*, *move*, *communicate,* and *save lives.*

Task Force Redhawk, the 2-91st TSB's engineer training battalion, was originally designed to help train and advise United States Army Reserve and Army National Guard combat engineer and bridging units in the brigade's area of operations. Following 9/11, the task force observer-controller/trainers (OC/Ts) initially provided mobilization assistance and collective training to many of the engineer companies and battalions. In the 11 months from May 2004 to April 2005, the battalion deployed with the brigade to Fort Bliss, Texas, to conduct postmobilization training for two complete brigade combat teams. While these combined arms teams included organic engineers, the task force's role expanded to encompass urban operations—including dismounted infantry and mounted patrol operations—for maneuver task forces, supporting engineers and maintenance formations (see "Urban Operations Training at the Power Projection Platform 'Welcome to Al Wadi,'" *Engineer,* July-September 2005, pp. 7-10).

Returning to Fort Carson in April 2005 with a highly professional and experienced OC/T corps, Task Force Redhawk assumed primary responsibility for the brigade's Joint Service Training Oversight (JSTO) Program, which includes the Air Force CST course. The mission not only would include instruction in basic combat skills but also would teach Air Force personnel to form combat teams capable of executing Army battle drills and operating while attached to Army ground forces. The task force completed seven CST rotations, training more than 1,000 Airmen by the end of 2005.

Feedback from deployed Air Force engineer leaders from the JSTO-13 class that graduated in December 2005 (shown as quotations throughout this article) has validated the importance of team building during the CST course. Typically, the Airmen filling these joint engineer teams are drawn from bases all across the world. The CST course is often the first opportunity officers and noncommissioned officers (NCOs) have to learn the personalities and assess the capabilities of those they will be with in theater.

"Training together as a team helped us to be ready when we arrived. We knew our team. If we just showed up in the area of responsibility from all our different bases, we would have had to come together as a team. Your training put us three weeks ahead of where we would have been."

Another key aspect of the training is the cultural shift for Air Force personnel who must become quickly immersed in Army doctrine and tactics, techniques, and procedures (TTP). Army troop-leading procedures (TLP), precombat inspections (PCIs) and precombat checks (PCCs), battle drills, and combat patrol standing operating procedures (SOPs)—ingrained in Army Soldiers from basic training forward—can be foreign and confusing to joint service members.

"It taught us how to talk Army. We are far outnumbered by Army where we work. We replaced an Army National Guard unit, and it helped to know something about Army culture so we could hit the ground running. We are working directly for the Army. It helped me fit in quickly among the Army command sergeants major at other camps."

More than just understanding Army acronyms, deploying Air Force leaders also need to understand Army tactical mission planning and execution. Therefore, the CST course includes a daylong seminar on the military decision-making process, Army TLP, and PCIs. Beyond Army "culture shock," deploying Airmen must also understand the culture and customs of two vastly different Muslim societies. During the CST course, Air Force personnel receive briefings on customs, culture, and a threat situation tailored to their theater location.

The Airmen in the current CST class will be stationed throughout Iraq and Afghanistan in a variety of roles. Some of these engineers will occupy field offices within Army facilities, while others—like EOD teams and firefighters—will operate directly out of Army forward operating bases (FOBs) in areas of operations where the threat of insurgent attack from improvised explosive devices (IEDs) is a daily reality. The CST course is designed to prepare everyone deploying for this dangerous environment. Expert counter-IED instruction from Task Force Redhawk's engineer OC/Ts is the first subject taught in the CST program. The Airmen are then issued a "training fleet" of Army M1114 high-mobility multipurpose wheeled vehicles (HMMWVs) and must operate in a simulated IED-threat environment for the remainder of the training at Fort Carson.

Airmen in the CST course receive 4 days of intensive Army Combat Lifesaver (CLS) training. While the Air Force teaches basic first aid, similar to Army buddy aid, Airmen in CLS learn advanced first aid techniques. The CLS phase includes familiarizing Air Force personnel with the Army medical evacuation (MEDEVAC) process, including the standard 9-line MEDEVAC request.

"We used the 9-line procedure when a bus rolled over just outside of camp. Training was important because 1 passenger was killed and 21 were wounded."

Airmen in the CST course then complete several more days of basic Army combat skills, including day/night driver's training on the HMMWV, Army communication procedures and equipment, and mounted/dismounted land navigation. Again, most Airmen are unfamiliar with basic Army small-unit equipment such as the Single-Channel Ground-to-Air Radio System (SINCGARS), frequency-modulated (FM) radio, and Precision Lightweight Global Positioning System (GPS) receiver (PLGR). Similarly, Air Force officers and NCOs tend to be more familiar with joint operations graphics than with the tactical maps used by most Army combat patrols. Task Force Redhawk's land navigation training also includes terrain analysis and the traditional engineer emphasis on understanding terrain through observation and fields of fire, avenues of approach, key terrain, obstacles, and cover and concealment (OAKOC) factors.

Next, JSTO Airmen tackle the lethality phase of the course, conducting premarksmanship instruction followed by range qualification for individual and crew-served weapons. Army rifle marksmanship is always a new experience for Airmen,

The combat patrol live-fire exercise allows Air Force leaders to plan a combat mission while Airmen test their ability to engage enemy targets in open and urban terrain.

who routinely qualify on paper targets at only 25 meters, while Army ranges feature "pop-up" target silhouettes in lanes at distances of 50 to 300 meters. This tests the Airmen's ability to scan, acquire, and engage multiple targets at true distances, using the full effective range of their weapons for perhaps the first time in their careers. The Air Force CST includes familiarization and qualification with the M249 squad automatic weapon and M240B machine gun, as well as an introduction to the M2 .50-caliber machine gun and the MK-19 grenade launcher. JSTO Airmen also conduct familiarization fire on the Army's short-range marksmanship course, testing their ability to fight their individual weapons systems effectively against enemy forces within 25 meters. The lethality phase concludes with classroom instruction on the most common threat weapons systems, including the AK-series automatic rifle and rocket-propelled grenades.

Air force personnel all appreciate the critical part that weapons training played in their deployment preparation.

"Weapons familiarization has paid off because we are armed whenever we travel. Many times Air Force personnel are lacking in weapons training and the Army team built great confidence in this area. The Air Force is changing its approach, and our basic training has been extended to place more emphasis on it."

The *shoot, move, communicate,* and *save lives* fundamentals all come into play in the final phase of the CST program, known as the combat patrol live-fire exercise. After two full days of practical exercises, rehearsals, and battle drills, the class is broken into groups of 20 to 25 personnel, occupying four to five HMMWVs. They are given a tactical mission requiring a patrol movement from one FOB to another. The live-fire exercise allows Air Force leaders to plan a combat mission while Airmen test their ability to engage enemy targets in open and urban terrain while mounted and moving. During the exercise, combat patrols encounter mock IEDs, react to ambushes, hastily recover damaged vehicles, and treat and then evacuate (simulated) casualties.

The CST course wraps up with an after-action review, followed by a course graduation and departure ceremony. At this ceremony, the Deputy Commanding General of Fort Carson reminds Airmen what is at stake during their upcoming deployment. *"The environment is dangerous and the enemy is constantly adapting,"* he is known to say, "*so every one of you has to be situationally aware and prepared to use the training you have had here at Fort Carson to save not only your own life but the lives of your team.*" His words are a fitting send-off for these joint warriors, who are headed into harm's way.

Lieutenant Colonel McClellan served with 2-91st TSB for eight months as the brigade executive officer before assuming command of the 1-361st Engineer Battalion (Training Support) in June 2004. Previous assignments include platoon leader, company commander, and battalion S-3. He has served combat tours in Operations Desert Shield, Desert Storm, and Iraqi Freedom and has had overseas experience in Europe, the Balkans, Korea, and Central America.

("One Team," continued from page 13)

platoon was astounding, as demonstrated by its flexibility, speed, and seemingly effortless execution of the mission.

Summary

Soldiers from 4th Platoon demonstrated that engineer Reserve units are well-trained and well-led; the ability to effectively conduct troop-leading procedures contributed to its success. The platoon would continue to capture terrorists and fight alongside of tanks, Bradleys, and infantrymen with Alpha Company. Sometimes, Reserve units do not have the same level of equipment as an Active Army unit, so cross-leveling of equipment is recommended.

When it came to the Soldiers of 4th Platoon interacting with other Soldiers in the company, there was never any question on their competence. It used to be the perception of some people in the military that USAR and Army National Guard forces were just a cut below the Active Army forces. The men of 4th Platoon destroyed that stereotype. Friendships were instantly formed between platoons with 3d Platoon, Charlie Company, 458th Engineer Battalion, calling themselves "fourth platoon" before anyone in the company identified them as such.

Once demobilized, the Soldiers of 3d Platoon, Charlie Company, 458th Engineer Battalion, went back to their premobilization lives. But the assistance of the Soldiers of 4th Platoon allowed Alpha Company to accomplish its mission with might and honor.

Captain Edmonds served as commander of Alpha Company, 91st Engineer Battalion.

Captain Stone served as executive officer of Alpha Company, 91st Engineer Battalion.

First Lieutenant Restrepo served as the leader of 1st Platoon, Alpha Company, 91st Engineer Battalion.

First Lieutenant Heaton served as the leader of 2d Platoon, Alpha Company, 91st Engineer Battalion.

Attention Units!

Many post offices will not deliver mail without a street address. Please contact us to update your mailing address if the one we are using for you does not include a street address. Include the old address and your telephone number, as well as the corrected address, and e-mail to *<engineer@wood.army.mil>*.

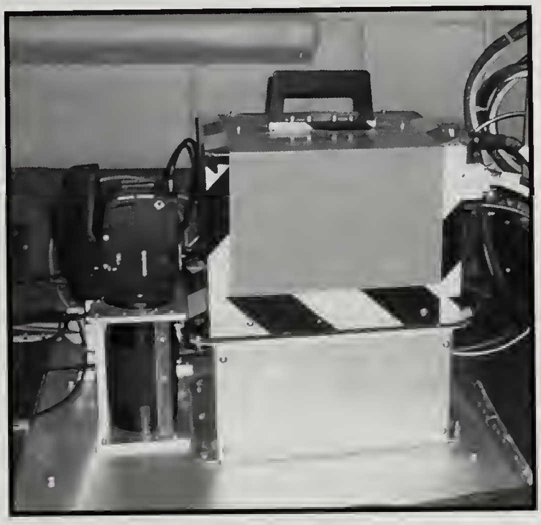
BuckEye Continues to Spiral to New Heights

By Ms. Karen Roberts

Born out of the need for a field-expedient change detection system to aid in spotting improvised explosive devices (IEDs), the BuckEye system has rapidly evolved from the initial prototype—based on electro-optical (EO) sensing—to a system using both high-resolution EO and light detection and ranging (LIDAR) imagery to produce highly detailed and accurate elevation data for better visualizing the battlefield.

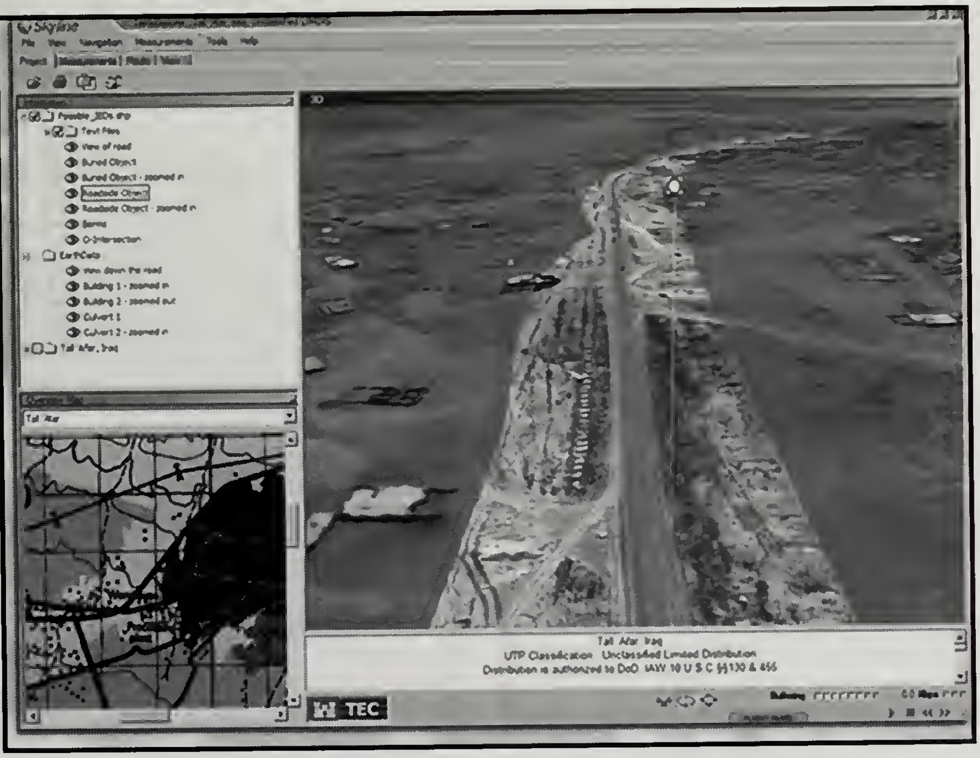
BuckEye is a rapidly fielded, spiral development program of the United States Army Corps of Engineers®, Engineer Research and Development Center-Topographic Engineering Center (ERDC-TEC). BuckEye provides Soldiers with high-quality battlefield information through high-resolution imagery; geospatial intelligence; elevation data; intelligence, surveillance, and reconnaissance (ISR); and detailed maps of the urban area of interest.

The BuckEye system is fully functional. Platform independent, the aerial system operates on a variety of vehicles. The latest application of the BuckEye system is flying with the newly integrated LIDAR sensor, which creates high-resolution digital elevation models. Currently, the images are quickly compressed, georeferenced, and tied together to form a mosaic. During post processing, the submeter resolution color images can be correlated to the LIDAR data to create exceptionally accurate, high-resolution three-dimensional maps of cities. These high-resolution maps can be used to help Soldiers visualize threats on the battlefield, conduct



Sensor Suite

(Continued on page 46)



Tal Afar Iraq
UTP Classification: Unclassified Limited Distribution
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Urban Tactical Planner Image

TEMPLATING AN ADAPTIVE THREAT

SPATIAL FORECASTING IN OPERATIONS ENDURING FREEDOM AND IRAQI FREEDOM

By Lieutenant Colonel Stephen R. Riese

Our adaptive adversaries in Afghanistan and Iraq continually challenge our ability to forecast future enemy activity and develop tactical plans. To meet these challenges, commanders and staffs need new tools that take advantage of the vast amount of information available to our troops.

The past decade has seen geographic information systems (GIS) move into the mainstream of tactical analysis. GIS are powerful tools that enable Soldiers in the field to collect, store, and analyze spatial information. Spatial information—where things are in relation to other things—has been a critical part of military planning as long as there has been war. And since almost every aspect of military operations has a spatial component, the range of potential GIS applications is almost endless.

One activity that GIS are particularly well-suited to help with is spatial-pattern recognition. Because GIS can make thousands or millions of distance calculations in minutes, analysts can now uncover and exploit patterns that might otherwise remain hidden. As seen in Figure 1, spatial patterns are present in many types of human behavior regardless of the scale. The unaided human eye can detect these patterns and groupings, but it usually requires the power of computers to help the analyst turn those patterns into tactically useful information.

Threat Mapper

In May 2004, the Army asked the United States Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC) to assess the potential that spatial analysis provides in forecasting the locations of future mortar attacks. The initial results were quite promising, and TRAC—in collaboration with the Engineer Research and Development Center–Topographic Engineering Center (ERDC-TEC)—began the development of *Threat Mapper*, a computer program to help analysts in the field make spatial forecasts in support of tactical intelligence operations.

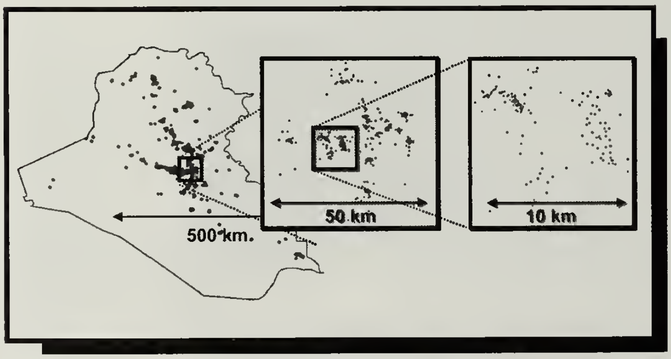

Figure 1. Patterns at various scales

Threat Mapper is designed for use at the tactical level, although it can be used at any echelon. Soldiers can use Threat Mapper to help with a variety of spatial forecasting and identification problems such as mortar attacks, weapons caches, and safe houses. Threat Mapper uses advanced pattern analysis techniques to measure the spatial similarity between an area of interest and an observed behavior. The results of that measurement are presented to the analyst in a threat map, which helps the staff build a more informed intelligence estimate and better plan intelligence, surveillance, and reconnaissance (ISR) and tactical operations (see Figure 2). Threat Mapper helps analysts recognize and adapt to changes in adversary behavior, even when that adversary is actively trying to appear random.

Threat Mapper currently functions as an add-in tool for ArcGIS, a commercially available GIS. ERDC–TEC's future plans for Threat Mapper include a Web-enabled version, as well as integrating spatial-forecasting methods into current and planned Army geospatial programs.

Tactical Forecasting

To illustrate how Threat Mapper can be used in the field, we built a simple threat map for an area that has had numerous mortar attacks. Figure 3 shows forward operating bases, roads, rivers, and the attacks that occurred in the area. These mortar attacks are the behavior of interest, meaning that the threat map will help us identify other locations probable for such attacks.

We first selected the features on which to measure spatial similarity. In reality, there is an almost endless list of spatial features, such as roads, buildings, and forests. In most cases, knowing which spatial feature to use is the most important and challenging task facing the analyst. Threat Mapper has several tools to help Soldiers determine the best set of features, but—as usual—experience, knowledge, and hard work are the best ingredients to build a successful intelligence product. Using the Threat Mapper tools, and a little trial-and-error, we will find a set of useful features.

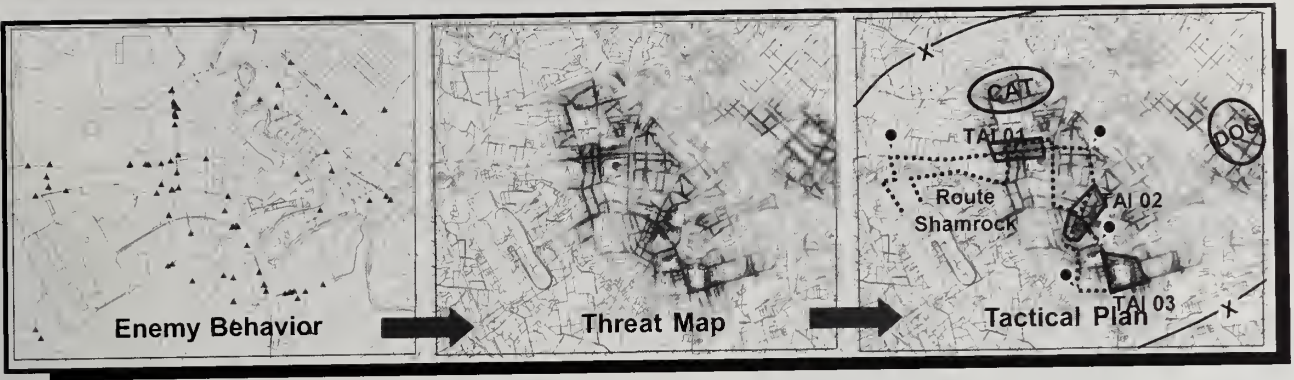

Figure 2. Threat Mapper application from enemy behavior to threat map to tactical plan

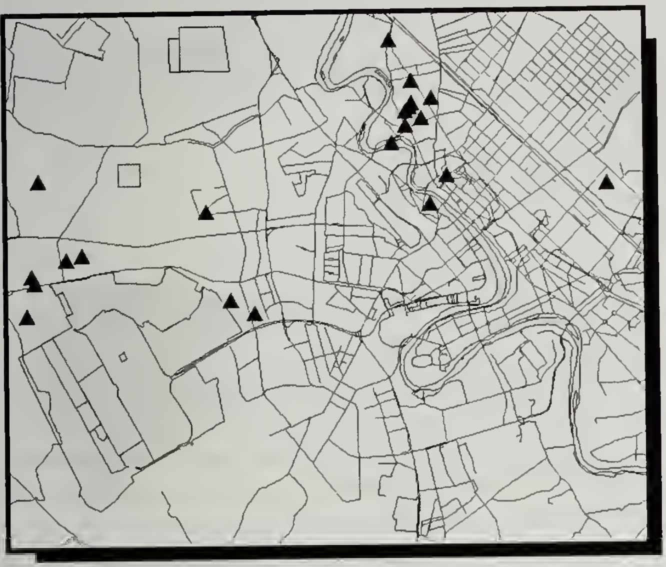

Figure 3. History of mortar attacks

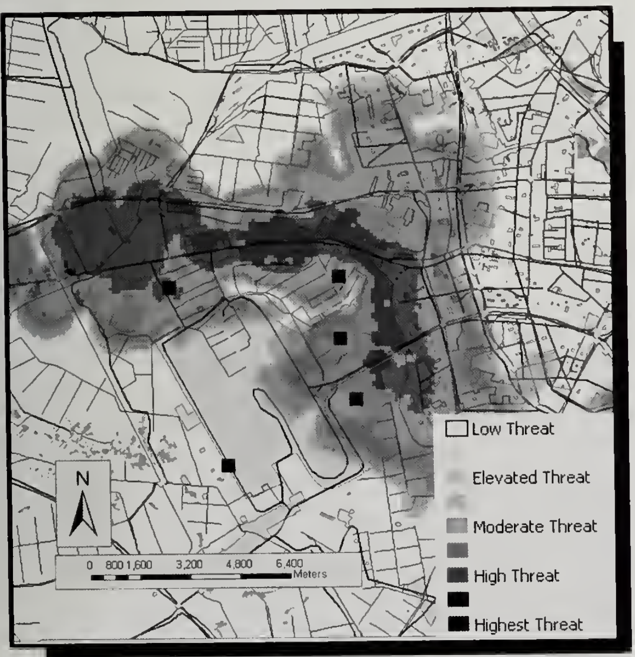

Figure 4. Sample threat map with scale

One way to help measure the threat map's accuracy, is to see how well the map forecasts future behavior. In real life, new attacks would tell us if the threat map is a good forecaster or not. Here, we will use the recent historical attacks to play the analytic role of new attacks. To do this, Threat Mapper splits the data, using the early attacks to build or train the threat map and the recent attacks to check or test the accuracy of the threat map. After providing Threat Mapper more details about the data and requirements for the desired map output, the analyst hits the "go" button and lets the GIS go to work. The result is the printed map in Figure 4.

The Road Ahead

The Threat Mapper tool is currently developed as a deployable package in beta form. It has been tested in a variety of situations by the military, academia, and government. Recently, a team led by the ERDC Cold Regions Research and Engineering Laboratory (CRREL) trained Army geospatial and intelligence analysts on a suite of deployable tools, including Threat Mapper. The analysts' training with these tools will provide valuable feedback to Threat Mapper developers at ERDC–TEC and CRREL.

Conclusion

A word of caution: There is a great deal of uncertainty about when and where the next attack, of any kind, will occur. Threat Mapper can help analysts in the field build a more informed intelligence estimate, but no tool can yet predict exactly when and where the next attack will be. Also, Threat Mapper will not replace Soldier analysts in the field. What Threat Mapper will do is provide analysts in the field with a powerful spatial-forecasting tool to help them better analyze threat activity and thereby gain an information edge against the adaptive enemy.

Lieutenant Colonel Riese is a combat engineer and operations research analyst with the United States Strategic Command at Offutt Air Force Base, Nebraska. He has worked with maps and spatial analysis in one form or another for most of his life.

MAPMAKERS SCOPE OUT IRAQI TERRAIN

By Sergeant Mitchell J. Armbruster

Soldiers with a terrain analysis detachment in Iraq provide maps and terrain analysis to the Corps Support Command (COSCOM) and its subordinate units to help them accomplish their missions. The detachment, part of an active duty brigade, is on its first deployment with a COSCOM. The detachment was chosen after working with the COSCOM on two field exercises.

The detachment works near the COSCOM headquarters, making maps or creating overlays that give information on soil type, vegetation, and hydrology that are in a specific area. Soldiers can use this information to understand the types of roads, rivers, or canals they might be dealing with, as well as the depth or slope of the terrain. There are tactical applications for this knowledge, but it can also help coalition forces give the Iraqi people vital information to help them stimulate their economy.

Terrain analysts work on customer projects.

The detachment can determine where vehicles can travel by soil type; they have a scale that ranges from *go*, *slow-go*, to *no-go*. By making these determinations, the terrain analysts can give units the vital information they need to make a mission successful.

The detachment makes hard copy maps or transfers the maps digitally to other parts of the COSCOM when needed. Their business is dictated by customer requests, and they have been extremely busy. Many units, after seeing the maps and products, have put in requests for their own maps.

Any map can be adapted to the needs of a unit. Most of the time, the team will use a map that is already made and add specific items to it. If items on the map—such as boundaries, buildings, or roads—have changed drastically, the map is reproduced. Terrain analysis is an ever-changing job because maps must be updated constantly.

Many things are involved with terrain analysis, such as cover and concealment and drop zones, that help U.S. forces secure victory with topographic analysis. The analysts in the detachment know that the work they do helps units and all Soldiers be successful.

Sergeant Armbruster is a public affairs specialist for the 207th Mobile Public Affairs Detachment, Fort Collins, Colorado. He holds a bachelor's in filmmaking and is working on a second degree.

Environmental Awareness Is for the Birds... and Everyone Else!

By Dr. JoAnne Castagna

A flock of young shorebirds spread their wings and fly away from their nests on East Inlet Island in the Long Island Intracoastal Waterway in New York for their first major flight south for the winter. A few years ago, this wouldn't have occurred because many of these birds are threatened and endangered. It's a reality now because people from several agencies put their minds together and created a project that not only benefits wildlife but their team players as well.

In 2002, the United States Army Corps of Engineers®, New York District—in cooperation with several environmental, state, and local agencies—created a wildlife habitat on this island for threatened and endangered bird species, using dredged sand from the waterway. Sand is regularly dredged to ease boat travel.

Photo by U.S. Fish and Wildlife Service–Long Island Field Office

East Inlet Island

This sand was placed on the mainland in the past, but Long Island's growing residential and business developments have limited land space. So the team of agencies had to think of another location, and they decided on an environmentally beneficial one.

For the past few years, shorebirds—such as least terns, common terns, piping plovers, and roseate terns—have colonized, nested, and bred on this island, demonstrating an example of how the Corps is collaborating with partnering agencies to produce successful environmental projects.

In the past, the dredging projects have been criticized by the public for affecting endangered shorebird habitats. Once the Corps proposed creating a bird habitat with the dredged sand, it received enthusiastic support. Some of the most vocal critics turned around and actually supported the innovative things the Corps was doing.

Performing environmentally friendly projects is hard at first but—in the end—is beneficial to all involved. The following are benefits that can be expected:

- *Strengthens customer relationships.* When customers, such as environmental agencies, see the positive results of environmentally aware projects, it increases their trust. As a result, these customers—who may have been originally wary—may be more open to providing ideas for improving the project.

- *Builds public trust.* When the public realizes that their quality of life has been enhanced in ways above and beyond the ones originally envisioned for the project, their trust and support of the project increases.

- *Saves time and money.* Performing an environmentally aware project is hard at first, but it gets easier. In the beginning, you may find yourself educating and convincing an organization of the benefits of the project. Trust must be built with environmental groups and agencies so they have confidence in what is being done. Once a project becomes a success story, the efficiency increases because it is easier for you to do the project. For example, it is less difficult to secure permits from the local people, and support for the project increases, which saves time and money.

- *Expands engineer skills.* You will experience a wider breadth of professional experience in the environmental field and gain personal satisfaction that you are doing good things, smart things.

- *Produces better projects.* A successful project receives increased customer support, allowing it to be produced more efficiently. Customers who are happy with the project will be open to providing ideas and suggestions for improvement and will work to remove potential project barriers, such as securing permits, saving the project time and money.

To be more environmentally aware, do the following:

- *Talk and listen.* Talk with the local people and resource agencies to get to know them, and listen to find out what they value and what their issues are. Put your head together with individuals who have ideas on how to make the project more environmentally friendly. This not only brings fresh ideas into the mix but also improves relationships with these individuals and groups.

- *Research.* Check out the Web sites of the major agencies or groups that you plan to work with, which will provide you their mission and priorities and might give you ideas.

Being environmentally friendly in projects requires innovation and creative thinking. As with any innovative or creative endeavor, it helps to have input from several different viewpoints. You cannot do this without including people who do not see the world as you do. The management of the group dynamics is the hard part—gaining individual trust and making the diverse group productive.

Dr. Castagna is a technical writer/editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

("BuckEye," continued from page 41)

BuckEye With LIDAR

mission planning, augment target folders, check on project status for the Corps's reconstruction projects, and gain a better understanding of the urban terrain.

BuckEye can be used to help increase security by capturing imagery throughout designated areas. This imagery gives the terrain a realistic look as to where features are in relation to the known landmarks. To a terrain analyst, BuckEye provides immense benefits with its imagery platform.

Army commanders are recognizing the benefits of having high-quality geospatial intelligence prior to executing their missions. The commander of the 1/25th Stryker Brigade Combat Team (SBCT) reported on one of these benefits. He said that Mosul is a teeming city of two million, making it easy for insurgents to hide and build vehicle-borne improvised explosive devices (VBIEDs) and IEDs out of sight. But the SBCT has the highest percentage of found VBIEDs and IEDs in Iraq, because it uses its assets to see first, before just running in, which was the way of the past.

Similarly, BuckEye is used to improve the Soldiers' situational awareness by providing them with highly accurate imagery that can be used to produce current, high-resolution reference graphics and image maps. It provides accurate and high-resolution geospatial information for terrain analysis, operating environment visualization, and change detection to assist the warfighter in achieving dominance of the battlefield.

BuckEye information is already being incorporated into the Urban Tactical Planner. According to the BuckEye program manager, the goal is to see the BuckEye system fielded with every Army terrain team to ensure that Soldiers have the edge they need to win the war.

Ms. Roberts is a public affairs specialist with the Engineer Research and Development Center–Topographic Engineering Center. She has been providing public affairs support to the Army for the past five years. She holds a bachelor's in social science and a master's in public affairs.

CLEARING THE WAY FOR WATERFRONT DEVELOPMENT

By Dr. JoAnne Castagna

Recently, on a cool, breezy morning on the Glen Cove waterfront in New York, the city's mayor stated to the public and media that as she stood before them, the last truckload of radioactive waste was being hauled from that property, clearing the way for a new waterfront development. Standing beside her were members of the United States Environmental Protection Agency (EPA); United States Army Corps of Engineers®, New York District; and state and local agencies that played major roles in making this milestone a reality for the small community.

Li Tungsten Superfund Site

The Li Tungsten Superfund Site is comprised of the former Li Tungsten facility; the Captain's Cove property, which was used as a disposal site for some of the facility's waste; and the Glen Cove Creek, which was contaminated with slag from the facility operations. For decades, the 1-mile industrialized portion of the Glen Cove waterfront was occupied by various industries, and a portion was used as a dumping ground. All of this occurred before the establishment of the strict environmental laws we have today.

Wah Chang Corporation and Wah Chang Smelting and Refining Company were two of these companies. Ironically, Wah Chang means "great development" (in part) in Chinese, and these companies—along with others such as the Li Tungsten Corporation—ran facilities on different portions of the site from the 1940s to the mid-1980s.

These facilities processed tungsten, a material used in industry to harden steel. The tungsten ores were received from around the world and smelted to produce items such as tungsten carbide powder, tungsten wire, and welding rods. The heavy metals and radioactive ore residues from this production process contaminated the property.

In the mid-1980s, the Li Tungsten Corporation—the last in a series of site operators—went bankrupt, and the property was purchased by the Glen Cove Development Corporation.

New York State asked the EPA Region 2 to investigate the property's land and nine buildings and to remove any contaminated waste left by the company.

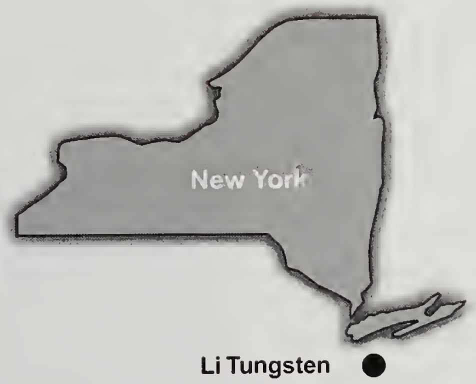

Photo by Mark Pane, EPA

An aerial view of the Li Tungsten Captain's Cove Site

The EPA found large quantities of hazardous materials, such as laboratory chemicals and polychlorinated biphenyl (PCB)-contaminated waste, in hundreds of rusted drums and in above- and belowground tanks. In addition, they discovered asbestos, transformers, and gas cylinders containing compressed liquids and gases, as well as elemental mercury spills on the property. An EPA contractor had the site remediated, and the most serious chemical and radioactive hazards were removed.

The EPA investigation also found low-level radiation and heavy metal contamination—posing a public health risk—in the soil throughout the 26-acre Li Tungsten facility, as well as in the nearby 23-acre Captain's Cove property that had been used as a dumping ground by area businesses and residents.

Corps Assists EPA

In the spring of 2005, the EPA issued an Interagency Agreement with the Corps's New York District to perform remediation work at the Captain's Cove portion of the Li Tungsten Superfund Site. The work was performed by the Corps's Kansas City District, which was responsible for excavating the soil, separating the radioactive and metal-contaminated soil from the noncontaminated soil, and transporting the contaminated soil to appropriately licensed disposal facilities.

Approximately 87,500 tons of radioactive soil and 35,000 tons of metal-contaminated soil have been removed from the site and transported to disposal facilities. This cleanup, along with the future cleanup of other areas of the site, must be completed to allow for the development of the waterfront. Throughout the construction period, the public has been protected from any potential health threats by monitoring the air quality and inspecting and cleaning trucks that enter and leave the property.

Waterfront Development

The Li Tungsten Superfund Site properties are the centerpiece for the community's plans to revitalize 214 acres of the city's waterfront. Glen Cove Industrial Development Agency's goal is to link the city's nearby downtown shopping area with the waterfront. Thirty percent of the development will be comprised of parks, public squares, nature walks, and botanical gardens. Pedestrian-friendly walking paths will be lined with restaurants, art galleries, stores, and hotels. In addition, there will be luxury condominiums and various modes of public transportation (trolleys, electric carts, water taxis, and ferry service) to New York City.

The waterfront development is expected to create as many as 1,700 new full-time jobs and bring in new business that will generate an estimated $200 million in annual sales. The Glen Cove waterfront development is expected to be completed in a decade.

To learn more about the waterfront development, visit <*www.glencove-li.com*> or for information about Superfund, visit the EPA Web site at <*www.epa.gov/superfund*>.

Dr. JoAnne Castagna is a technical writer/editor with the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

Environmental Compliance Officers in Iraq

By Major Kenneth D. Kozak

Environmental compliance officers (ECOs) in Iraq face big challenges. They deal with issues such as hazardous waste; radioactive lightning arrestors; petroleum, oil, and lubricant (POL) spills and contaminated soils; and hazardous waste pickups. In addition, ECOs oversee hazardous material and waste storage, wastewater/sewage facilities, burn-pit/trash operations, and fuel storage. They conduct environmental assessments, environmental baseline surveys, cultural and archeological resource protection programs (there are more than 8,000 of these sites in theater), endangered-species management, and environmental site closure of bases. Environmental training is the key to enabling ECOs to appropriately manage these issues.

After serving as a civil/structural engineer for the past five years with the 99th Regional Readiness Command, I was assigned to Iraq to oversee the country's ECO program. To garner command emphasis for ECO appointments and training, I prepared an ECO fragmentary order (FRAGO) for staffing with the Multinational Corps-Iraq (MNC-I). The FRAGO (Training for Major Subordinate Command [MSC] and Base Camp Environmental Compliance Officers) was approved and made part of the MNC-I operation order (OPORD). The purpose of this FRAGO was to identify and train an ECO at the MSC level and at least one ECO on each forward operating base/base camp in theater.

Wanting to ensure that all appointed ECOs received the appropriate training, I contacted the Directorate of Environmental Integration (DEI), United States Army Engineer School, at Fort Leonard Wood, Missouri, and requested assistance in making training available to all the ECOs stationed in Iraq.

One training option is for MNC-I C-7 (engineer section) Environmental to deliver classroom training to ECOs in theater who need certification or recertification. With the support of the information management section, Soldiers also have the option of accessing the ECO course on the MNC-I C-7 Environmental Web site or through Army Knowledge Online (AKO). The third training option is a compact disk (CD) developed by DEI that contains the ECO course and test. MNC-I C-7 would provide each MSC several of these CDs, and the respective MSC ECO would be responsible for distributing the course, tracking the test results, and submitting the results to MNC-I C-7 on the provided ECO spreadsheet.

Soldiers must receive a minimum score of 70 percent on the test to become ECO-qualified. The MNC-I C-7 will submit all

Constructing an incinerator

A new sewage treatment plant

passing scores and names to the Army Training Support Center, at Fort Eustis, Virginia, for credit.

I am also working to provide support through an information network for ECOs. A previous FRAGO (Hazardous Materials and Hazardous Waste Procedures) to MNC-I OPORD requires that all bases appoint an ECO. Each MSC should have a list of ECOs for the forward operating bases/base camps. If there is not a current list, Task No. 5 of a recent FRAGO reinforces the order to comply by stating that not only will all ECOs be identified and trained, but a chain of command to address environmental concerns, problems, and any questions will be established. The ECOs have reachback capability to MNC-I C-7 if an environmental issue does occur or questions arise.

It is a challenge for the ECO Soldiers stationed in Iraq, who use the Overseas Environmental Baseline Guidance Document (OEBGD), the United States Army Forces Central Command (ARCENT), and MNC-I C-7 Environmental standing operating procedures as the standard for environmental issues. Currently, there are no environmental guidelines set by the government of Iraq. But with training and an information network, the ECOs are providing a better environment to sustain the mission and secure the future for our Soldiers and the Iraqi people.

Major Kozak, a reserve engineer officer, is the environmental officer assigned to the MNC-I C-7 office in Iraq. He holds a bachelor's in civil engineering from Penn State.

•••••• The Engineer Writer's Guide ••••••

Engineer is a professional-development bulletin designed to provide a forum for exchanging information and ideas within the Army engineer community. We include articles by and about officers, enlisted soldiers, warrant officers, Department of the Army civilian employees, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to engineers. Articles may share good ideas and lessons learned or explore better ways of doing things.

Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. Text length should not exceed 2,000 words (about eight double-spaced pages). Shorter after-action-type articles and reviews of books on engineer topics are also welcome.

Include photos (with captions) and/or line diagrams that illustrate information in the article. Please do not include illustrations or photos in the text; instead, send each of them as a separate file. Do not embed photos in PowerPoint. If illustrations are in PowerPoint, avoid excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi. Images copied from a Web site must be accompanied by copyright permission.

Provide a short paragraph that summarizes the content of the article. Also include a short biography, including your full name, rank, current unit, and job title; a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime telephone number.

Articles submitted to *Engineer* must be accompanied by a written release by the author's unit or activity security manager prior to publication. All information contained in the article must be unclassified, nonsensitive, and releasable to the public. *Engineer* is distributed to military units worldwide and is also available for sale by the Government Printing Office. As such, it is readily accessible to nongovernment or foreign individuals and organizations.

We cannot guarantee that we will publish all submitted articles. They are accepted for publication only after thorough review. If we plan to use your article in an upcoming issue, we will notify you. Therefore it is important to keep us informed of changes in your e-mail address or telephone number. All articles accepted for publication are subject to grammatical and structural changes as well as editing for style.

Send submissions by e-mail to <*engineer@wood.army.mil*> or send a 3 1/2-inch disk in Microsoft Word, along with a double-spaced copy of the manuscript, to: Editor, *Engineer Professional Bulletin*, 320 MANSCEN Loop, Suite 348, Fort Leonard Wood, Missouri 65473-8929.

Note: Please indicate if your manuscript is being considered for publication elsewhere. Due to the limited space per issue, we usually do not print articles that have been accepted for publication by other Army professional bulletins.

Constructing the First TUAV Landing Zone on Fort Bragg

By Captain Stephen C. Amato

The 618th Engineer Company (Light Equipment) (Airborne) completed the first dedicated tactical unmanned aerial vehicle (TUAV) landing zone on Fort Bragg in early August 2005. The project has long been needed to provide training space for the TUAV aircraft. Named "Ram Landing Zone," it was constructed with the installation support of the Land Rehabilitation and Maintenance (LRAM) section of Integrated Training Area Management (ITAM)—an element of the Directorate of Plans, Training, and Mobilization. The 618th completed the landing zone, which covered just less than 5 acres, in approximately 5 weeks—a quick turnaround for a multiagency project.

Selecting a Site

The 82d Airborne Division's pinnacle event each training quarter is the joint forcible-entry exercise (JFEX) that includes United States Air Force aircraft dropping personnel and equipment and possible support from A-10s or other attack aircraft. This brigade combat team (BCT)-level event includes airborne operations followed by air-land support into a drop zone's landing zone to build combat power for the exercise. The 313th Military Intelligence Battalion's TUAV platoons participate in the JFEX, but they needed their own training space. The airspace coordination required that the TUAV flight path be a given distance away from the Fort Bragg training area boundary and situated where it would have little effect on Army aviation airspace or artillery restricted operations zones to fire through when the TUAV was launched or landed.

Once range control decided to allow the construction of the landing zone at Ram Drop Zone, the next task was to fit the landing zone within the area around the endangered wildlife and plants, marshes, and perimeter tree line and in line with the prevailing wind. The TUAV specifications also require a clear area at the ends of the landing zone.

Design Criteria

The requirements for a TUAV launch-and-recovery site are more stringent than most of the specifications for expeditionary aircraft (for example, the C-130 Hercules) primarily because of the nature of the Shadow 200 TUAV. But even though the landing zone would be built as a launch-and-recovery site, it is described as a landing zone because it can still be used to land small aircraft, if required.

Project Design

Construction of the landing zone began soon after the project was approved by the division as a good concept and worth applying funding toward. The initial courses of action consisted of three possibilities:

Drainage swale and check-dams provide drainage for the landing zone.

- An aggregate subgrade on geotextile with a clay cap.
- An aggregate subgrade on geotextile with a stabilized clay cap.
- An aggregate subgrade on geotextile with a concrete cap.

The primary problem with all of these courses of action was cost, and after much consideration, the third one was deemed the only affordable solution. During the discussions over funding sources for the site, a new idea emerged. ITAM personnel asked if it would be feasible for the 618th Engineer Company to clear and grub, then grade and level, the site. A contractor would be hired to stabilize the in-place surface of the landing zone, using ITAM tillers and the 618th's Caterpillar® CS-433C Type III "Z-lite" steel drum vibratory rollers. The LRAM section would assist with runway stabilization and erosion control measurements—further reducing the cost—and would coordinate with the North Carolina Department of Environment and Natural Resources of Fayetteville and Raleigh for compliance with state regulations and policies. Lastly, ITAM would fund hydroseeding of the area around the landing zone to provide soil stabilization.

ITAM contacted Midwest Industrial Supply, Inc., Canton, Ohio (because of the company's ability to stabilize soil using custom-made emulsions), and a Midwest chemist visited the site and took soil samples in order to prepare an admixture for the landing zone. The material used would consist of polyvinyl acetate acrylic polymer emulsion known as Soil Sement®. When this customized mixture is added to the native soil, the material provides a dense, compacted surface. The benefits of such a runway are that it requires little maintenance for long periods of time, eliminates the need for dust control, and can be used during inclement weather. Many Midwest products have been approved by the Engineer Research and Development Center (ERDC) and are in the General Services Administration catalog. These include dust suppressants, additives for improved asphalt road longevity, and a high-mobility multipurpose wheeled vehicle (HMMWV) dust control water distributor.

Project Timeline

Clearing and grubbing the site required several days. This operation, which was fairly straightforward, involved removing all the organic material from the site. The initial topographical survey completed by the company's surveyors revealed the site to be generally flat, but it still required a considerable amount of cut-and-fill operations to build the needed drainage and slope for the landing zone. The grading and leveling of the landing zone required the company to manage the poor water percolation on-site with drainage swales and check-dams to prevent soil erosion on and off the project site.

Once the 618th brought the site to the proper grade, it compacted the surface in preparation for the stabilization phase. ITAM used its offset disk tillers and scarified the landing zone surface, and Midwest followed the tillers with its applicator truck—applying roughly 18,000 gallons of Soil Sement to the surface of the soon-to-be landing zone. The 618th then graded the tilled soil to a level grade and followed up with Caterpillar CS-433C rollers (without using the vibrator) for compaction. The stabilized landing zone was allowed to "cure" for 24 hours before Midwest sprayed a final surface application of 1,500 gallons of Soil Sement, which sealed the surface and provided additional strength.

Grading, leveling, and drainage construction operations using the 613BS Scraper and DEUCE

Training With the Landing Zone

The first training exercise at Ram Landing Zone was during the August 2005 JFEX. The TUAVs were integrated into the ground tactical plan of the JFEX without affecting the air coordination of numerous airborne drops of personnel and equipment that same week.

The 313th Military Intelligence Battalion is proposing additional facilities adjacent to the landing zone, which will improve the overall value of the site. These include a covered TUAV maintenance area, an improved vehicle parking area, and a power/telephone drop.

The landing zone project was a resounding success. It served as a realistic training event for the Soldiers of the 618th Engineer Company, facilitated realistic TUAV training, and improved TUAV training locations on Fort Bragg.

Reference

Midwest Industrial Supply, Inc.; Canton, Ohio, 800-321-0699, <*www.midwestind.com*>.

Captain Amato is the commander of the 618th Engineer Company (Light Equipment) (Airborne). Previous assignments include S-4 for the 307th Engineer Battalion during Operation Iraqi Freedom; brigade engineer for the 505th Parachute Infantry Regiment; and plans and exercises officer for the 2d Infantry Division Engineer Brigade. He holds a bachelor's in civil engineering from the Illinois Institute of Technology and a master's in engineering management from the University of Missouri-Rolla.

ENGINEER UPDATE

Commercial numbers are (573) 563-xxxx and Defense System Network (DSN) numbers are 676-xxxx unless otherwise noted.

Urban Mobility Breaching Course (UMBC). The UMBC is a 3-week course conducted at Camp Lejeune, North Carolina, by the United States Marine Corps, with assistance from three United States Army engineers. Two weeks of the course are consolidated training, and the remaining week is Army-unique. The maximum Army course load for the UMBC is 15 students. Slots for the course can be reserved through the Army Training Requirements and Resources System (ATRRS).

The UMBC provides advanced information on urban breaching operations. The course consists of in-depth explosive theory; detailed planning that combines operational and training safety issues; urban reconnaissance; and employment of urban breaching assets, including explosive, manual, and ballistic breaching techniques for urban operations. The UMBC teaches the use of Current Force equipment that supports mobility operations in support of the maneuver force.

Students must meet requirements listed in Department of the Army Pamphlet 611-21, *Military Occupational Classification and Structure,* and Army Regulation 600-9, *The Army Weight Control Program;* be a combat engineer noncommissioned officer in the grade of E-5 (P) through E-7 and a graduate of the combat engineer Basic Noncommissioned Officer Course (BNCOC); have no pending Uniform Code of Military Justice (UCMJ) actions; and have no limiting profiles.

Fiscal Year 2006 Class Schedule

Class Number	Report Date	Graduation Date
01-05	16 Oct 05	4 Nov 05
02-05	27 Nov 05	16 Dec 05
03-05	22 Jan 06	10 Feb 06
04-05	26 Feb 06	17 Mar 06
05-05	4 Jun 06	23 Jun 06
06-05	13 Aug 06	1 Sep 06
07-05	10 Sep 06	29 Sep 06

The point of contact for this course is the Directorate of Training and Leader Development (DOTLD) Sergeant Major at (573) 563-4094 or e-mail <*atsedot@wood.army.mil*>. *The* DOTLD Web site is <*http://www.wood.army.mil/dotld/*>.

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Center for Engineer Lessons Learned (CELL). The United States Army Engineer School CELL needs your help. To keep training, doctrine, and combat developments current and to prepare for the future, it is critical that the school continuously receive relevant engineer observations, insights, and lessons (OIL). The CELL can derive information from a variety of sources: unit after-action reports (AARs); tactics, techniques, and procedures (TTP) used by units in and returning from theater; Soldier observations/submissions to the Engineer School; and requests-for-information (RFIs).

This information is used to conduct doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) gap analyses and to determine solutions. These solutions are distributed to the Engineer Regiment via new doctrine and training products, *Engineer* (The Professional Bulletin of Army Engineers), and other publications, Web sites, and by answering RFIs. (The Engineer School RFI Web site provides the Engineer Regiment a reachback capability.)

You can help by forwarding any of these materials from your unit's deployment to the CELL. Unclassified information can be sent to <*Doctrine.Engineer@wood.army.mil*> or <*reggie.snodgrass@us.army.mil*>. Classified information can be sent by secure Internet protocol, routed (SIPR) e-mail to <*snodgrassrg@monroe.army.smil.mil*>. For more information, call (573) 563-4117.

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Visual Archive. The History Office at the Engineer School is developing a visual archive. It currently has more than 18,000 photographs, largely from World War II and Korea. Units that would like to contribute photographs (copies) or other visual material should contact Dr. Larry Roberts, Historian, United States Army Engineer School, Fort Leonard Wood, Missouri 65473. Where possible, caption information should accompany the images. If you have questions, call Dr. Roberts at (573) 563-6109.

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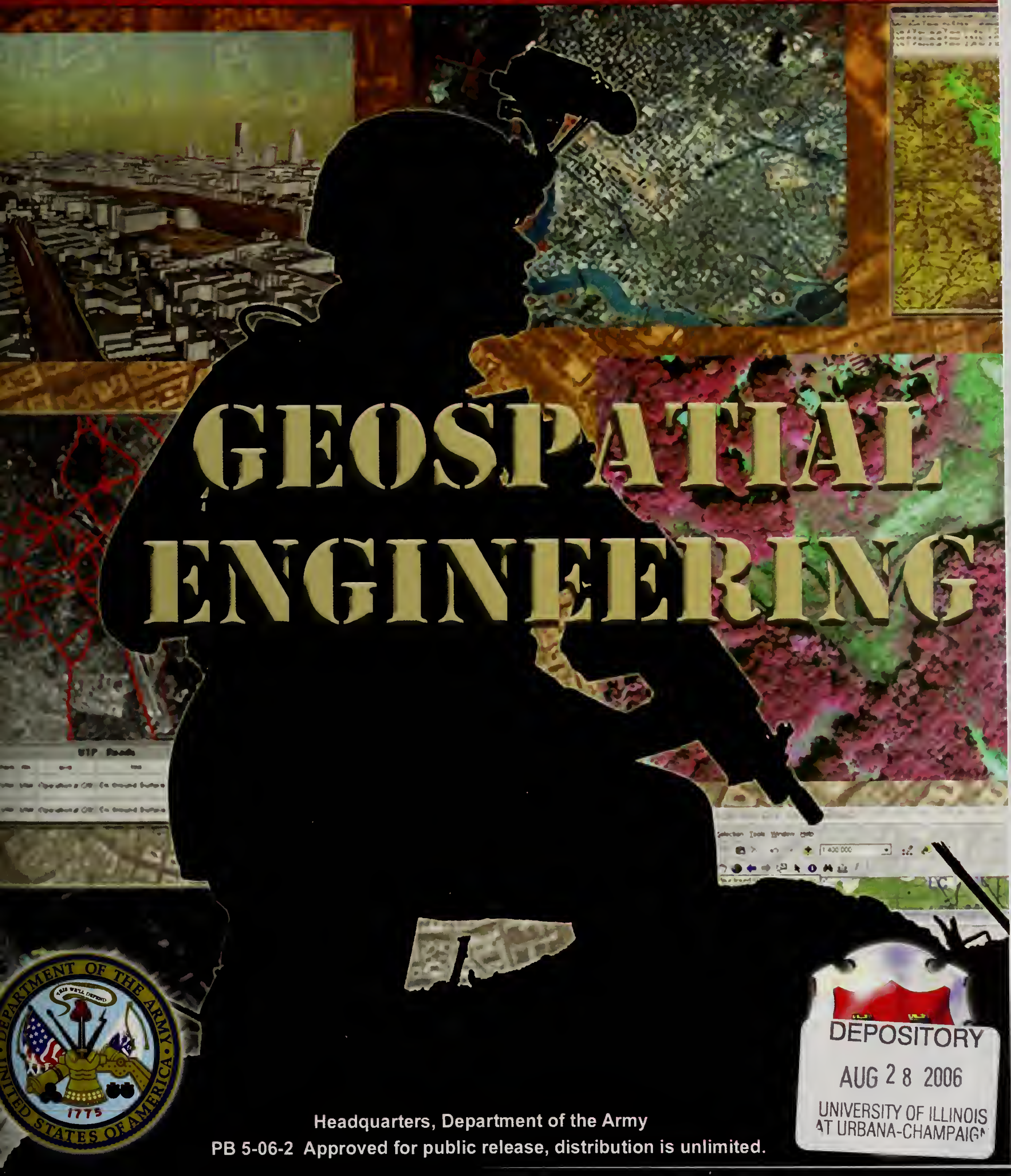
ENGINEER

The Professional Bulletin of Army Engineers

April-June 200



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ENGINEER

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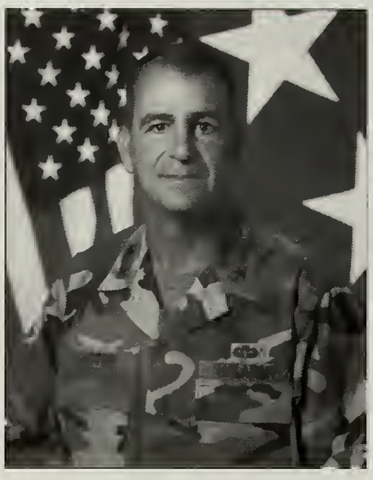
Clear The Way

By Major General Randal R. Castro
Commandant, United States Army Engineer School

Our Vision



Welcome to our Summer issue of *Engineer*. I want to begin this issue by thanking all the great Soldiers who are serving our country each and every day. We cannot thank you enough for all the tasks you accomplish day in and day out.

I recently spoke to the leadership of the Regiment at ENFORCE and described our vision for the next two years. What I want to do in this issue is share this vision with you. I want to tell you all the great things we are accomplishing as a Regiment. If you were not able to attend ENFORCE, the slides can be found under Army Knowledge Online (AKO) files (Select the Site Map tab, then Organizational Sites, MACOMs, TRADOC, Schools [right column], Engineer, and MG Castro's ENFORCE 2006 Brief).

I have received many e-mails from across the Army telling me about all the missions you are doing every day. As you have all told me, our engineers are performing many missions outside of our Cold War-era focus of high-intensity combat operations. We are rebuilding nations, constructing base camps, conducting route clearance missions, and supporting our citizens' recovery after hurricanes Katrina and Rita—while continuing to transform to our Modular Engineer Force. These missions range across a broad spectrum of requirements for our engineers. Why are we busier than ever and supporting this broad array of missions? The reason is twofold: our contemporary operating environment (COE) has changed, and our doctrine and national security strategy are changing.

First, the environment we are fighting in has ever-increasing requirements for the capability sets we engineers bring to the battlefield while fighting an asymmetric enemy. The demands of fighting in urban and complex terrain place an increased reliance on what we engineers need to do to support our maneuver and joint commanders. Secondly, our recently published National Security Strategy captures this and, as a result, has placed stability operations on equal par and priority as combat operations. This profound change expands our mission-essential task list (METL) and is a major rebalancing of our mission set. FM 3-0, *Operations*, (2006 draft) will highlight this difference and will broaden civil support to homeland security. These increasing requirements for engineers make our Regiment more indispensable than ever to our Army and our Nation.

To take the lead in this changing landscape, I have reread our current Engineer School Vision and the Regimental Vision.

Engineer School Vision

- *A world-class center of expertise in joint engineer capabilities*
- *Recognized leader in developing doctrine, units, and equipment capable of assuring the mobility of the land force—anytime, anywhere!*
- *World's best trainer of military engineers for an Army serving a Nation at war*

Regimental Vision

- *Assure freedom of maneuver for the land force and maintain relevance to the Nation*

As you can see, the School and Regimental visions are broad, and there is a distinct gap between the two. I intend to focus on this gap and provide you a clearer road map ahead for the next two years.

I believe that there are three essential tasks we must continue to accomplish from now through FY08: We must continue to support the Global War on Terrorism (GWOT); we must complete the transformation of the Regiment; and we must posture the Regiment for the next transformation in order to remain indispensable to our Army and the Nation. These are the three major lines of operations on which we are moving forward, and I want to synchronize our efforts.

The **Regimental Vision** *through FY08 is to continue to support GWOT with trained modular organization and complete the modular force and institutional transformation, while posturing for the next transformation.*

(Continued on page 4)

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

Greetings once again, and welcome to another issue of *Engineer*. This has been a very busy quarter for our Regiment. Among the many events that took place were our annual ENFORCE Conference, which included the 2d Annual Best Sapper Competition and the dedication of the Sapper Statue at the Engineer Memorial Grove. We were honored to have Mrs. Brigit Smith with us for the unveiling of the Sergeant First Class Paul Ray Smith Medal of Honor plaque at the Memorial Grove. Mrs. Smith also dedicated the Medal of Honor Flag to the Regiment; the Flag is proudly displayed in the Regimental room.

ENFORCE week ended with the Regimental dinner and presentation of the annual Regimental awards, which included the Itschner and Outstanding Engineer Platoon Leader (Grizzly) Awards, the Sturgis Medal, and the Van Autreve Award. The recipients of these awards—from the Active Army, United States Army Reserve, and the Army National Guard—are listed on page 38. The 2006 Best Sapper Competition winners are listed on page 26. The recipient of the 2006 Gold deFleury Medal was Major General Jack Waggener (Retired). This year, Lieutenant General Carl A. Strock, Chief of Engineers, awarded a second Gold deFleury posthumously to Sergeant First Class Paul Ray Smith. Mrs. Smith accepted the medal in his honor.

We continue to improve our training here at Fort Leonard Wood. A few courses that are going well include the Route Reconnaissance/Clearance Operations Course, the IED Defeat Train the Trainer (IEDD T3) Course, and the Urban Mobility Breaching Course. I need assistance from the field in supporting the Mine Dog Course. At the same time, we have taken some of the functional courses and inserted them into initial-entry training (IET), the Advanced Noncommissioned Officer Course (ANCOC), the Basic Noncommissioned Officer Course (BNCOC), the Officer Basic Course (OBC), and the Captain's Career Course (CCC). These courses will be the foundation of how we will build our forces over the next couple of years.

Today's Noncommissioned Officer Education System (NCOES) is a rigid, task-based system designed around the select-train-promote model, instead of training the NCOs for a mission and wide range of assignments that are encountered on today's battlefield. NCOES should remain focused on the core areas of leading, training, maintaining standards, caring for Soldiers, technical competencies, and tactical warrior skills, while integrating greater conceptual and interpersonal skills. We must ensure that we continue to provide first-class training to a first-class NCO Corps. We have identified the need to support the Army Force Generation (ARFORGEN) model by providing an opportunity for NCOs to receive training at home station. The goal is to continue to send NCOs to resident courses; however, when the opportunity and need arise, we will send a mobile training team (MTT) to conduct the training. We have an opportunity to send an MTT to Fort Bragg this summer to teach BNCOC, which will allow Soldiers to remain at home with their families and attend the course.

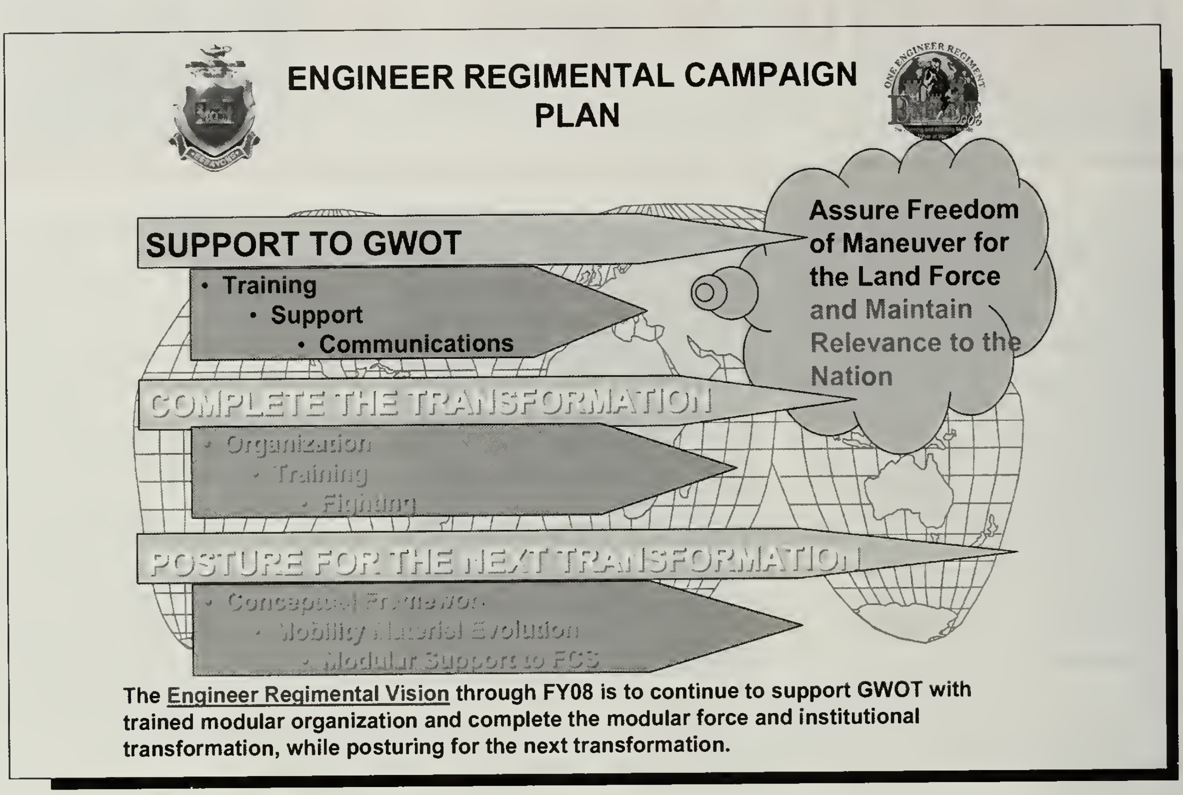
As we continue transforming to a Modular Engineer Force, we will activate the 4th Engineer Battalion at Fort Carson. In FY07, the following units will be activated: 326th Engineer Battalion, 62d Engineer Battalion, 7th Engineer Battalion, and the 11th Engineer Battalion. We reflagged the 36th Engineer Group to the 36th Engineer Brigade and will relocate the unit to Fort Hood. I would like to personally welcome the 94th Engineer Battalion advance party from Grafenwoehr, Germany, as it begins to restation here at Fort Leonard Wood. Some of these great Soldiers are here preparing their motor pool and headquarters to receive the main body. Fort Leonard Wood welcomes these great Wolverine Warriors.

I would like to congratulate Sergeant Major Terrence Murphy, who was appointed to the rank of Command Sergeant Major. It was a great honor for Brigadier General Todd T. Semonite and me to promote this great Soldier. We wish him and his family the best as he moves on to take a great battalion at Fort Hood.

Once again, I would like to say thank you for all of your efforts and contributions in supporting the Global War on Terrorism; we continue to transform the Regiment. As each day comes, let us keep in mind all the families of the Soldiers who have given their lives for this great Nation. There is no greater love than for a man to lay down his life for a friend or brother.

Essayons!

(*"Clear the Way," continued from page 2*)



ENGINEER REGIMENTAL CAMPAIGN PLAN

SUPPORT TO GWOT

- Training
    - Support
        - Communications

COMPLETE THE TRANSFORMATION

- Organization
    - Training
        - Fighting

POSTURE FOR THE NEXT TRANSFORMATION

- Conceptual Framework
    - Mobility Materiel Evolution
        - Modular Support to FCS

Assure Freedom of Maneuver for the Land Force and Maintain Relevance to the Nation

The Engineer Regimental Vision through FY08 is to continue to support GWOT with trained modular organization and complete the modular force and institutional transformation, while posturing for the next transformation.

Support to GWOT

Our No.1 priority and our *first line of operation* is support to GWOT. Since 2001, we have continually captured your lessons learned from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), brought those back to our school, and used them to change doctrine and what we teach in preparing our Soldiers and units for war. It is a significant revolution from how we conducted business since the post-Desert Storm period. This revolution begins with you and all of your Soldiers who have been there and done that! I see three subrevolutions in supporting the GWOT: *training*, *support*, and *communications*. In the next two years, I expect to bring many of our revolutionary initiatives to completion.

Training. The first revolution is in training. If you have been to Fort Leonard Wood recently and attended any school from Basic Training to the Engineer Captain's Career Course or a functional course, you have experienced part of this change. We have immersed Fort Leonard Wood into a COE where scenario-based training is the standard. At the most basic level, our training maps reflect Arabic names and scenarios in all our training. The entire post replicates a combat theater. We have surged to construct eight military operations on urbanized terrain (MOUT) sites, including Iraqi villages; nine forward operating bases (FOBs); five shoot houses; and two convoy live-fire ranges and have modified numerous ranges to reflect the COE. More than any other school in TRADOC! Our convoy live-fire range, a realistic scenario-based training opportunity for our trainees, replicates improvised explosive device (IED) and insurgent attacks. We have a weapons immersion program for our Soldiers, where they maintain their weapons with them at all times and learn the fundamentals of weapon discipline, just like our deployed Soldiers.

Another change you will find includes our initial-entry training (IET). The days of drill sergeants breaking down trainees and eliminating them immediately have passed. Drill sergeants treat everyone as a "Soldier from Day One." The focus is on maintaining the standards while using coaching, teaching, mentoring, motivating, and training to lift those who need a little extra time. This method has reduced attrition and kept young men and women in the Army who volunteered and have a desire to serve our Nation. At the same time, we have increased the rigor: five times as much field time, advanced rifle marksmanship, and total combat task focus in order for us to not just get Soldiers ready for their first unit, but to get them ready for combat!

In our Officer Education System, we have increased contingency training, integrated our transformed unit modified tables of organization and equipment (MTOEs), and significantly increased hands-on explosive hazards and IED training. This summer we will take Basic Officer Leader Course II and III into full implementation, and our new lieutenants will go to Fort Benning or Fort Sill to receive common-core training before arriving at Fort Leonard Wood for their functional training. We also have a new pilot course—the Joint Engineer Officer Course—which is an 80-hour course (distributed learning and resident) to prepare our captains and majors to serve on joint staffs.

The most significant changes are in our functional courses. Before GWOT, we had only the Precommand Course and the Sapper Leader Course. Now we have 12 courses, including the Urban Mobility Breaching Course, the Route Reconnaissance/Clearance Operations Course (both mechanical and robotic), the IED Defeat Train the Trainer (IEDD T3) Course, the Advanced Search Course, and the Explosive Ordnance Clearance Agent (EOCA) Course. We are constantly evaluating requirements for additional training. At the same time, we are taking the critical tasks from our functional courses and inserting them into IET, the Advanced Noncommissioned Officer Course (ANCOC), the Basic Noncommissioned Officer Course (BNCOC), the Officer Basic Course (OBC), and the Captain's Career Course (CCC). This is a tremendous effort to better prepare and train our engineer Soldiers based on lessons learned in theater. These courses will be the foundation of how we train the force for GWOT over the next two years.

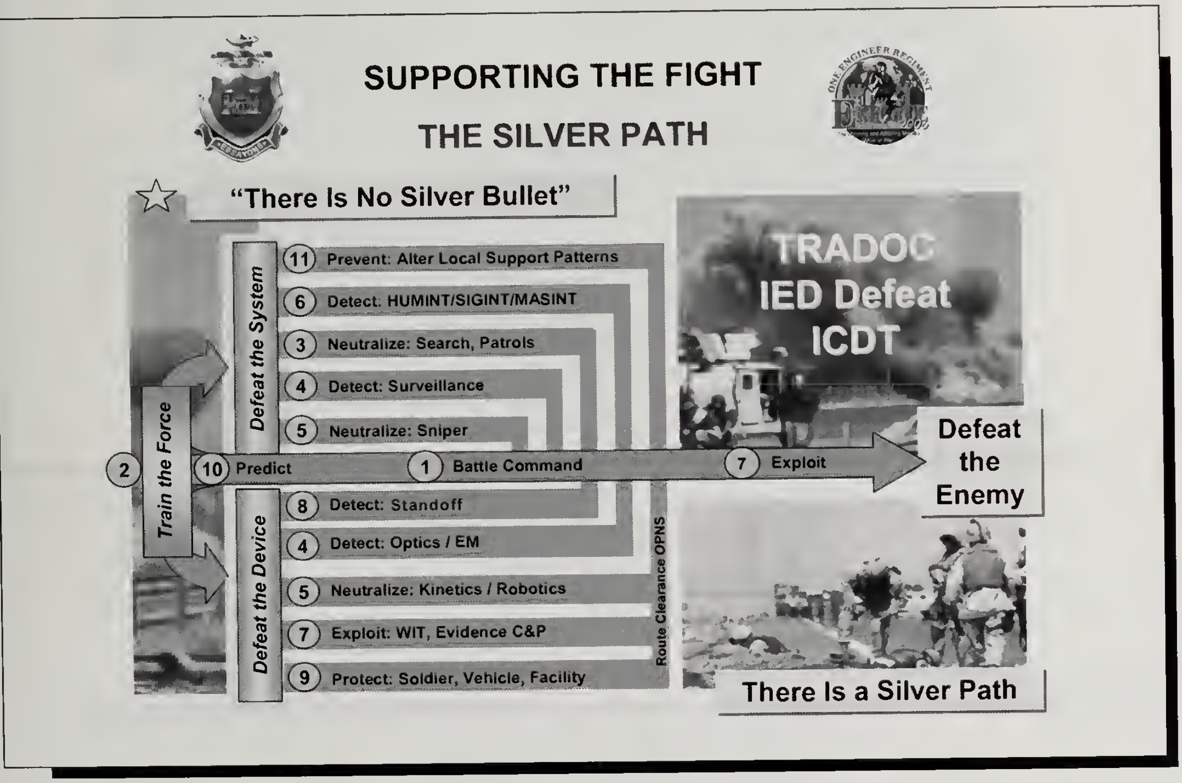
Support. The second revolution of supporting the fight has evolved significantly from pre-OIF to now. The Counter Explosive Hazards Center (CEHC) was established in 2002 to support a recognized gap in explosive hazards and work the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) integration of these solutions. With the ever-increasing IED threat in theater, the Department of Defense (DOD) has recognized the need to rapidly train and equip the force with the skills and tools to predict, prevent, detect, neutralize, and mitigate IEDs for all deploying forces (assured mobility).

There are three major pillars of support to this effort:

- The first pillar is the TRADOC Integrated Capabilities Development Team (ICDT). Over the next two years, we will continue to play a critical role in this team, integrating the various school efforts to develop, teach, and integrate individual, crew, leader, small-unit, and functional training courses.
- The second pillar is the Joint Center of Excellence, which has the mission to support units as they prepare for deployment at the training centers and to provide combined arms training for these forces.
- The third pillar is the Joint IED Defeat Organization and Army Staff that will organize, develop, synchronize, and integrate solutions across the DOTMLPF spectrum for IED defeat in urban and complex terrain for DOD and the Army.

Together, these organizations will develop systemic processes to improve training and develop technological and materiel solutions to defeat IEDs and all counter explosive hazards.

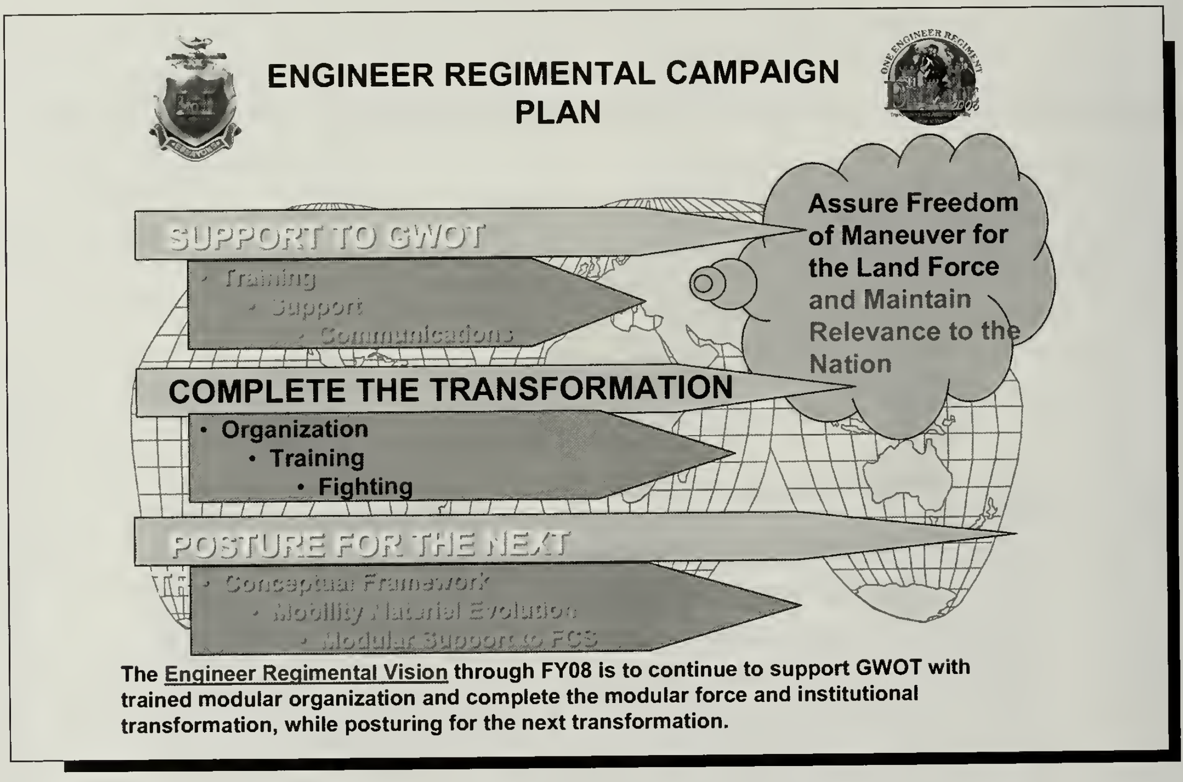
These organizations realize there is no "silver bullet" solution to solve the IED threat and that this incredibly tough mission can only be accomplished in a system-of-systems approach. Our IED Defeat Task Force and the CEHC developed a Silver Path that looks at how we train the force to defeat the "device" and also defeat the IED system. The Silver Path takes the fundamentals of assured mobility as a framework and builds on it to improve our ability to exploit lessons learned and defeat the enemy.



Integrating these lessons learned is absolutely the most important aspect of our functional courses and drives success on the core of our Silver Path. For example, the Advanced Search Course evolved from an identified gap in skills and tools for maneuver forces and engineers. The course teaches our sappers the latest tactics, techniques, and procedures for the conduct of area, route, person, and occupied and unoccupied building searches.

Another area where we are closing a gap is the engineer/explosive ordnance disposal (EOD) integration. Our engineer skills have changed focus over the years since Vietnam (booby traps), Desert Storm (mobility), the Balkans (mines/unexploded ordnance [UXO]) to now OEF/OIF (IEDs/captured enemy ammunition [CEA]). This broader spectrum of requirements and greater demands has developed a gap between EOD personnel and engineers. We are closing this gap with the EOCA Course, FMI 3-34.119, *Improvised Explosive Device Defeat,* etc. We have even exchanged officers and noncommissioned officers in critical positions between the Engineer and the Ordnance Schools. Over the next two years, we plan to close this gap completely and seamlessly conduct operations with EOD personnel on the battlefield.

Communications. The third and final revolution is in how we communicate. I want us to truly change into a collaborative community in the next two years. In the past, the Engineer School talked to units via e-mail or telephone, the United States Army Corps of Engineers® used TeleEngineering Kits, and units talked in isolated conversations between commanders and their staffs. But today, we are establishing the Battle Command Knowledge System (BCKS), which is a collaborative Web site within AKO that allows you to converse simultaneously with your peers with recent experience or instructors at schools to discuss various subjects. It should be as easy as switching between your e-mail and another screen, allowing you to converse on any range of subjects that pertain to you or your unit. BCKS will allow us to tap into everyone simultaneously and to provide the ultimate reachback capability. Implementing these dramatic changes in our support to GWOT is essential but is also directly linked to our successful transformation.



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Complete the Transformation

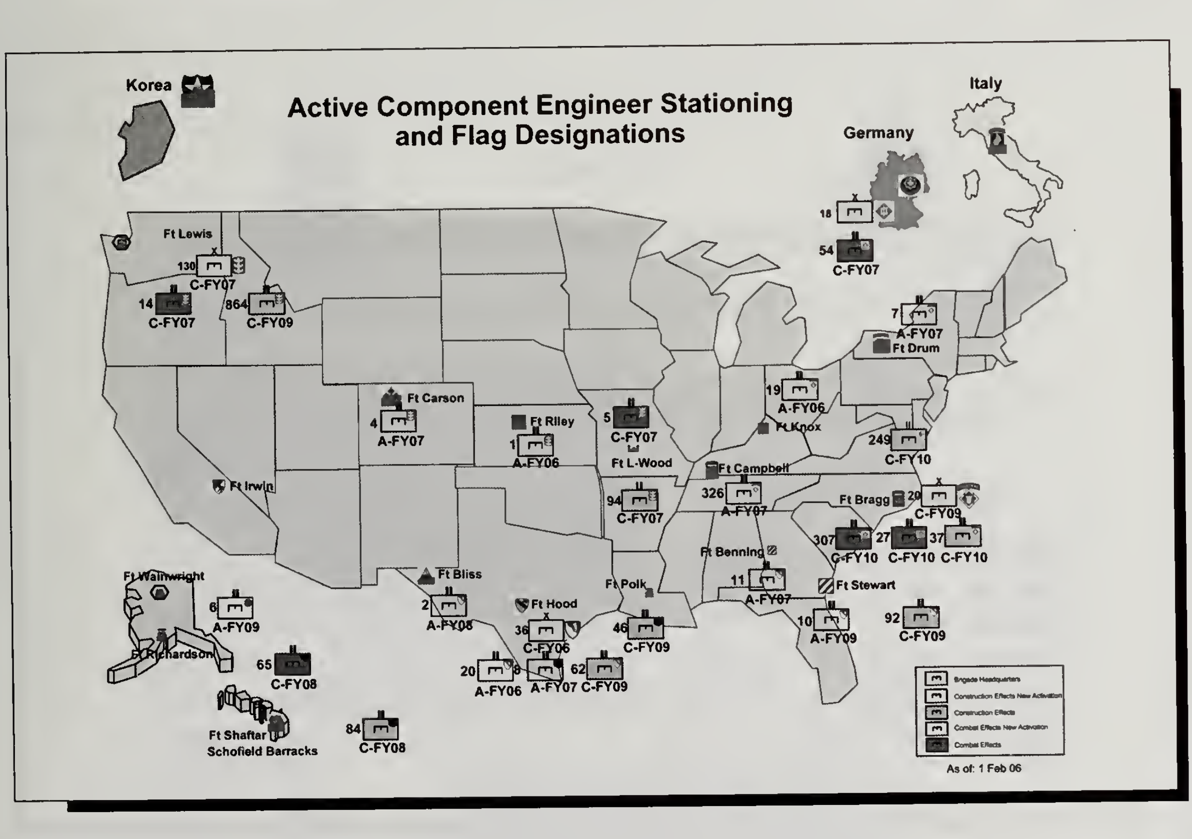
Our *second line of operation* is to complete the transformation. We began this journey a few years ago with an analysis of how we would transform as part of the Army's modular force structure. We took an offensive and aggressive look at modularizing the Regiment and reducing the number of MTOEs, military occupational specialties (MOSs), etc., while identifying the critical engineer support requirements in the brigade combat teams (BCTs) and the engineer forces that would be force-pooled above the division level. This required a paradigm shift of how we would organize, train, and fight the Engineer Regiment.

Organization. If you look at how we were organized before the transformation, you will see that the majority of our combat engineer battalions were embedded in brigades and divisions prepared to fight for a predetermined fight (symmetric or force-on-force). However, as we move through this transformation, our objective is to organize by embedding an engineer company in the BCTs and force-pooling the remaining engineers above the division for maximum flexibility in task-organizing for an undetermined type of fight.

Training. How we train will change as well. We will transition our collective training from METL focus to initially a modular capabilities focus.

Fighting. Finally, how we fight will evolve as well. We will go from fighting engineer companies with battalion-level command and control to focusing on engineer mission teams (EMTs) and engineer mission forces (EMFs) (task-organized modules at the company level [EMTs], and task-organized modules and/or EMT engineer task forces [EMFs]). These units will be fighting independently or in support of BCTs and divisions. We will also shift from our two common scenarios of Europe and Southwest Asia to having the flexibility to not only fight any enemy, anywhere in the world, but also be able to task-organize ourselves for the particular requirement of the force.

When the transformation began, I explained to many of you that we would experience a trough because several of our engineer battalions and organizations would be temporarily reduced. During a two-year period, engineer units would inactivate, waiting for BCTs to stand up within the Army personnel constraints until they would activate again as a force-pooled organization. Your school house and FORSCOM realized that this did not make sense, and they have worked diligently to convert units sooner in lieu of inactivating and then activating them. We all know this is no small feat. The result is that we were able to move a handful of battalions forward into FY06 and FY07. In fact, we stood up two engineer battalions already in FY06 and will stand up five more in FY07. The result is that instead of waiting until 2011 to get our battalions back, most of them will be in place within the next few months. We will even come out of the transformation with more engineer company command opportunities than before the transformation!


Active Component Engineer Stationing and Flag Designations

As of: 1 Feb 06

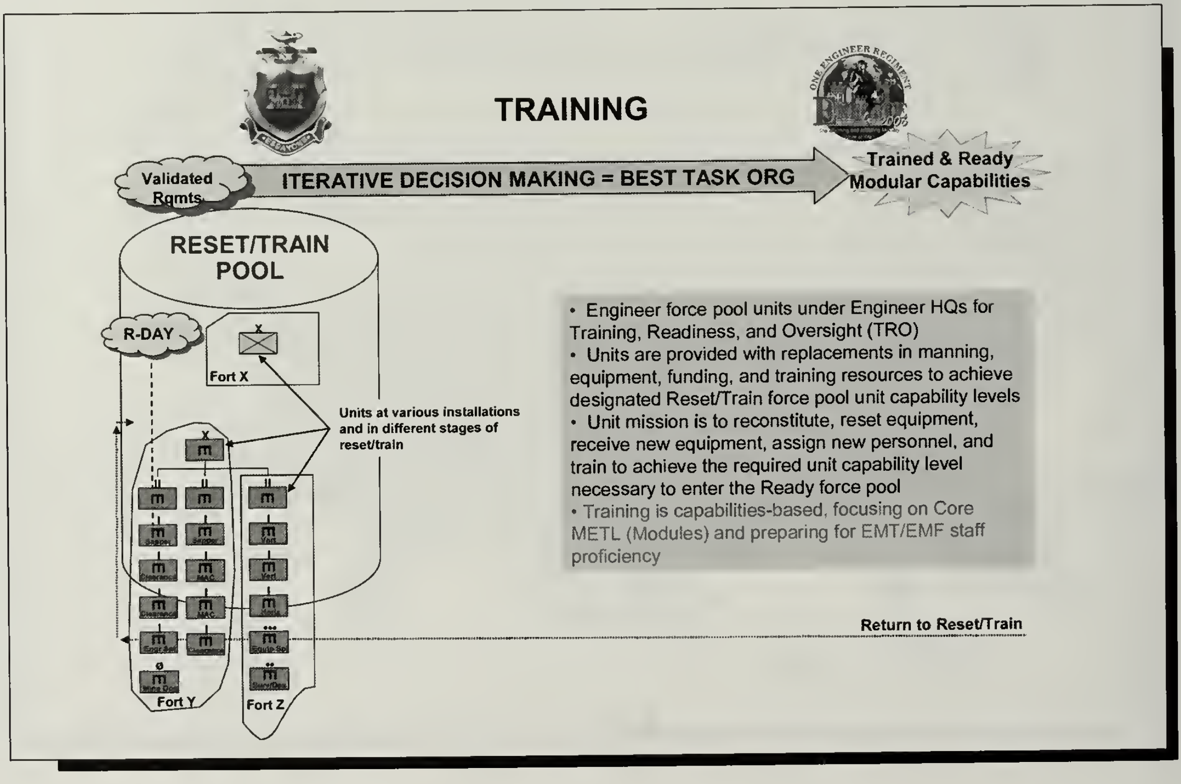
It has not been easy for this transformation to take place. As many of you know, we are trying to resource GWOT, transform units, and move organizations in accordance with Base Realignment and Closure (BRAC) requirements. Sometimes a unit gets caught trying to do all three. In response, the Engineer School has stood up a Fusion Cell to deconflict these issues. The Cell meets every Friday via telephone and videoteleconference with representatives from FORSCOM, Department of the Army, unit commanders, Army Materiel Command (AMC), etc., to work through their issues. It is working. We have a plan for all these Active Army units to transform in the next few years. But more importantly, the National Guard and Reserve have a plan that dovetails ours and complements capabilities and command and control throughout the Regiment. The National Guard transformation is led by the respective states, and the Reserve is led by the four Regional Readiness Sustainment Commands (RRSCs).

As these units come on line, we will see more of our modules being tailored for specific missions. Force-pooled engineer units will organize similar to the way maneuver company teams and task forces organize for specific missions. For example, an engineer brigade may receive a mission to perform a stability/reconstruction operation. The brigade commander assigns a battalion commander to take his battalion headquarters module to command and control a mission force. He provides him modules from other battalions that include a survey section, two horizontal companies, one vertical company, and a sapper company. We have now mission-tailored his organization into an EMF.

If you understand how this will occur, you will understand that the role of the engineer battalion commander at home station will be twofold: The force-pooled battalion commander will provide training, readiness, and oversight (TRO) for "training modules to excellence" and prepare his staff for fighting subordinate organizations as EMTs and EMFs. This will facilitate how we integrate into the Army Force Generation (ARFORGEN) process. Engineer brigade commanders will provide TRO over multiple battalions that may be stationed at other installations. By 2008, every force-pooled battalion and separate engineer organization will be assigned within one of our engineer brigades.

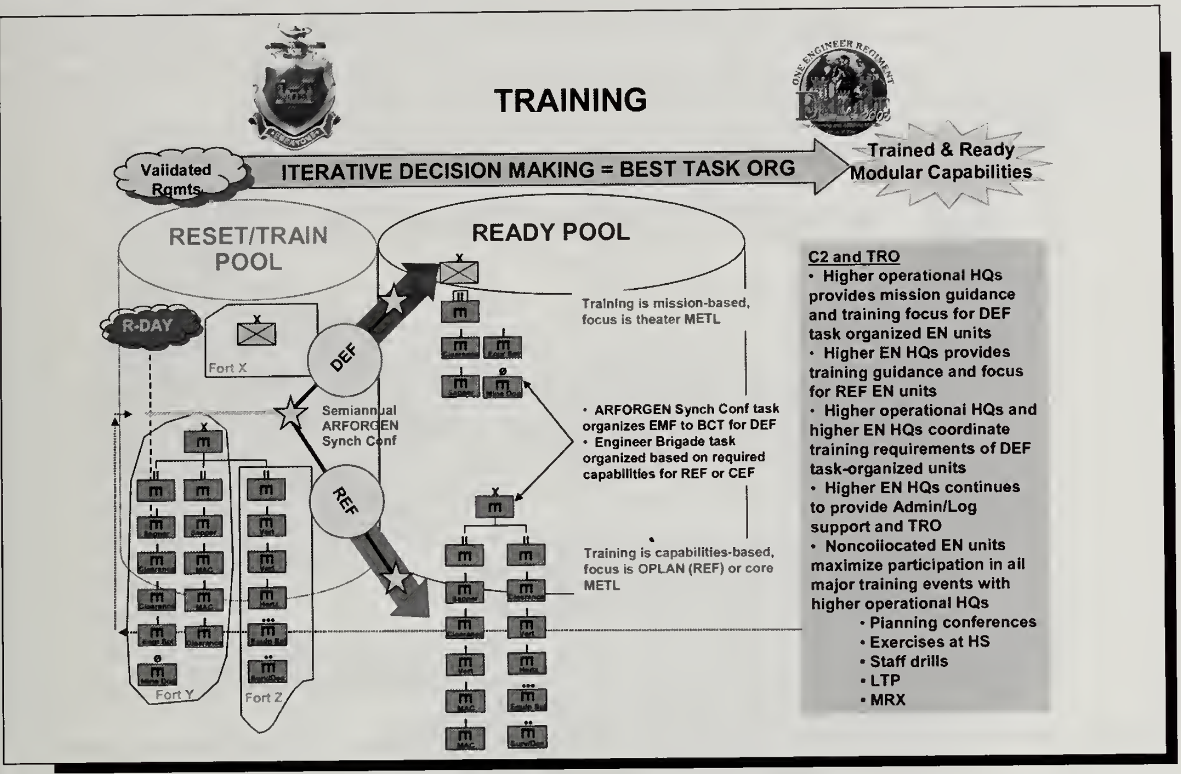
The ARFORGEN process is the objective. We are not currently organized in this manner, but that is the intent over the next couple of years. It is defined as *a structured progression of increased unit readiness over time, resulting in recurring periods of availability of trained, ready, and cohesive units prepared for operational deployment in support of regional combatant commander requirements.*

The way it will work is not difficult to understand. A unit starts in the reset/train pool. At this time, an engineer unit is force-pooled under a brigade headquarters. They will provide TRO of their subordinate engineer modules. Units during this phase will reconstitute, reset equipment, field new equipment, reassign and receive new personnel, and train. The training is capabilities-based, focusing on module METLs and preparing for EMT/EMF staff proficiency.



- Engineer force pool units under Engineer HQs for Training, Readiness, and Oversight (TRO)
- Units are provided with replacements in manning, equipment, funding, and training resources to achieve designated Reset/Train force pool unit capability levels
- Unit mission is to reconstitute, reset equipment, receive new equipment, assign new personnel, and train to achieve the required unit capability level necessary to enter the Ready force pool
- Training is capabilities-based, focusing on Core METL (Modules) and preparing for EMT/EMF staff proficiency

When units move to the ready pool, they will be assigned a specific deployment mission or be available as a ready force. The units assigned a deployment order will task-organize into EMT/EMFs and train with a focus on mission-based theater METL. Engineer units will be tailored for the specific mission requirements. The ready units will continue to train, focused on capabilities-based requirements of an operational plan or their core METL.



TRAINING

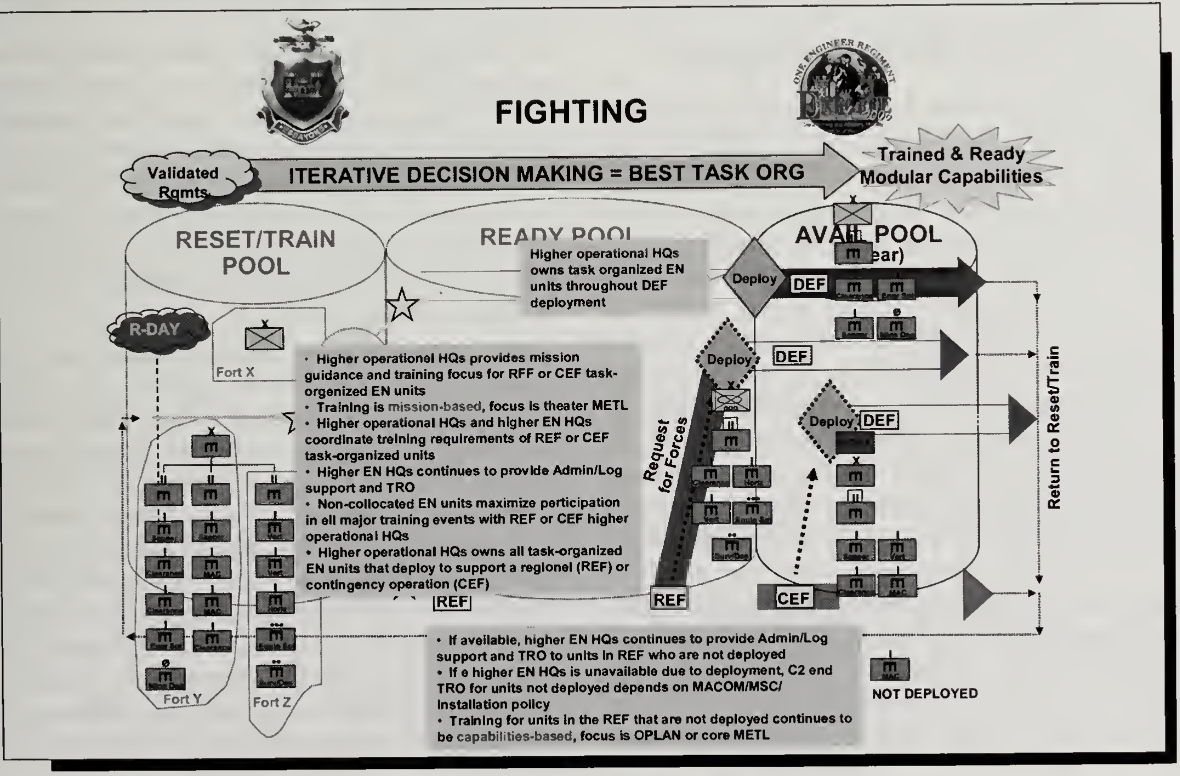
Validated Rqmts
ITERATIVE DECISION MAKING = BEST TASK ORG
Trained & Ready Modular Capabilities
RESET/TRAIN POOL
READY POOL
R-DAY
Fort X
DEF
REF
Semiannual ARFORGEN Synch Conf
Fort Y
Fort Z
Training is mission-based, focus is theater METL
Training is capabilities-based, focus is OPLAN (REF) or core METL

- ARFORGEN Synch Conf task organizes EMF to BCT for DEF
- Engineer Brigade task organized based on required capabilities for REF or CEF

C2 and TRO

- Higher operational HQs provides mission guidance and training focus for DEF task organized EN units
- Higher EN HQs provides training guidance and focus for REF EN units
- Higher operational HQs and higher EN HQs coordinate training requirements of DEF task-organized units
- Higher EN HQs continues to provide Admin/Log support and TRO
- Noncollocated EN units maximize participation in all major training events with higher operational HQs
    - Planning conferences
    - Exercises at HS
    - Staff drills
    - LTP
    - MRX

Finally, in the available pool, units with deployment orders will deploy and conduct their missions. The ready pool units may be task-organized for another deployment mission, sent on a contingency mission, or possibly not deploy but remain in a ready pool. The process is cyclic and will maintain each unit at an appropriate readiness rate depending on where it is in the process.



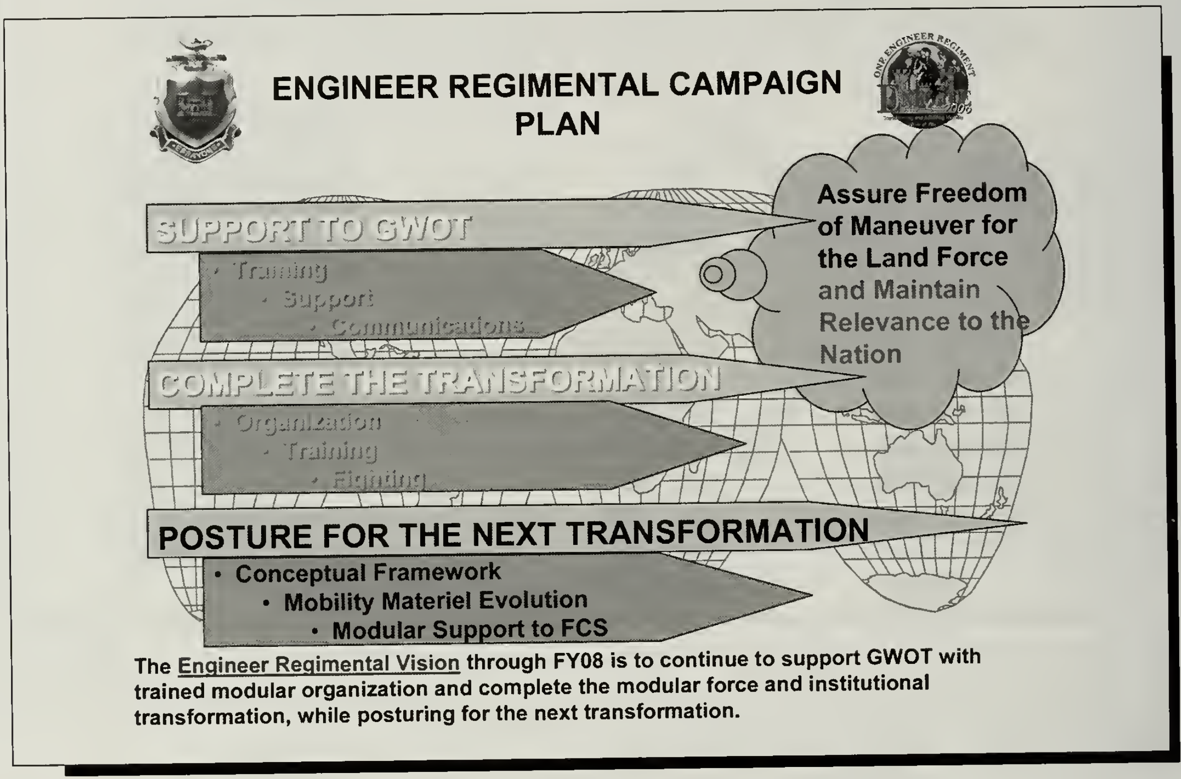
FIGHTING

Higher operational HQs owns task organized EN units throughout DEF deployment

- Higher operational HQs provides mission guidance and training focus for RFF or CEF task-organized EN units
- Training is mission-based, focus is theater METL
- Higher operational HQs and higher EN HQs coordinate training requirements of REF or CEF task-organized units
- Higher EN HQs continues to provide Admin/Log support and TRO
- Non-collocated EN units maximize participation in all major training events with REF or CEF higher operational HQs
- Higher operational HQs owns all task-organized EN units that deploy to support a regional (REF) or contingency operation (CEF)

- If available, higher EN HQs continues to provide Admin/Log support and TRO to units in REF who are not deployed
- If a higher EN HQs is unavailable due to deployment, C2 and TRO for units not deployed depends on MACOM/MSC/ Installation policy
- Training for units in the REF that are not deployed continues to be capabilities-based, focus is OPLAN or core METL

To complete the transformation, we will continue to improve our materiel systems. We have a great team that has increased our Program Objective Memorandum (POM) FY08 to FY13 requirements to $10.6 billion. This includes upgrades to our equipment and new purchases such as the Armored Breach Vehicle and the Joint Assault Bridge. Additionally, there has been a significant fielding plan for our route clearance missions. We have more than half of our desired end state of seven route clearance companies fielded with Buffalos, Interim Vehicle-Mounted Mine Detectors (IVMMDs), and RG-31 Mine Protected Vehicles. Our construction equipment will be entered into the Service Life Extension Program (SLEP) and reset while we work to up-armor the fleet of Deployable Universal Combat Earthmovers (DEUCEs) and High-Mobility Engineer Excavators (HMEEs). This is the largest upgrade to the engineer fleet in decades!



ENGINEER REGIMENTAL CAMPAIGN PLAN

SUPPORT TO GWOT
- Training
  - Support
    - Communications

COMPLETE THE TRANSFORMATION
- Organization
  - Training
    - Fighting

POSTURE FOR THE NEXT TRANSFORMATION
- Conceptual Framework
  - Mobility Materiel Evolution
    - Modular Support to FCS

Assure Freedom of Maneuver for the Land Force and Maintain Relevance to the Nation

The Engineer Regimental Vision through FY08 is to continue to support GWOT with trained modular organization and complete the modular force and institutional transformation, while posturing for the next transformation.

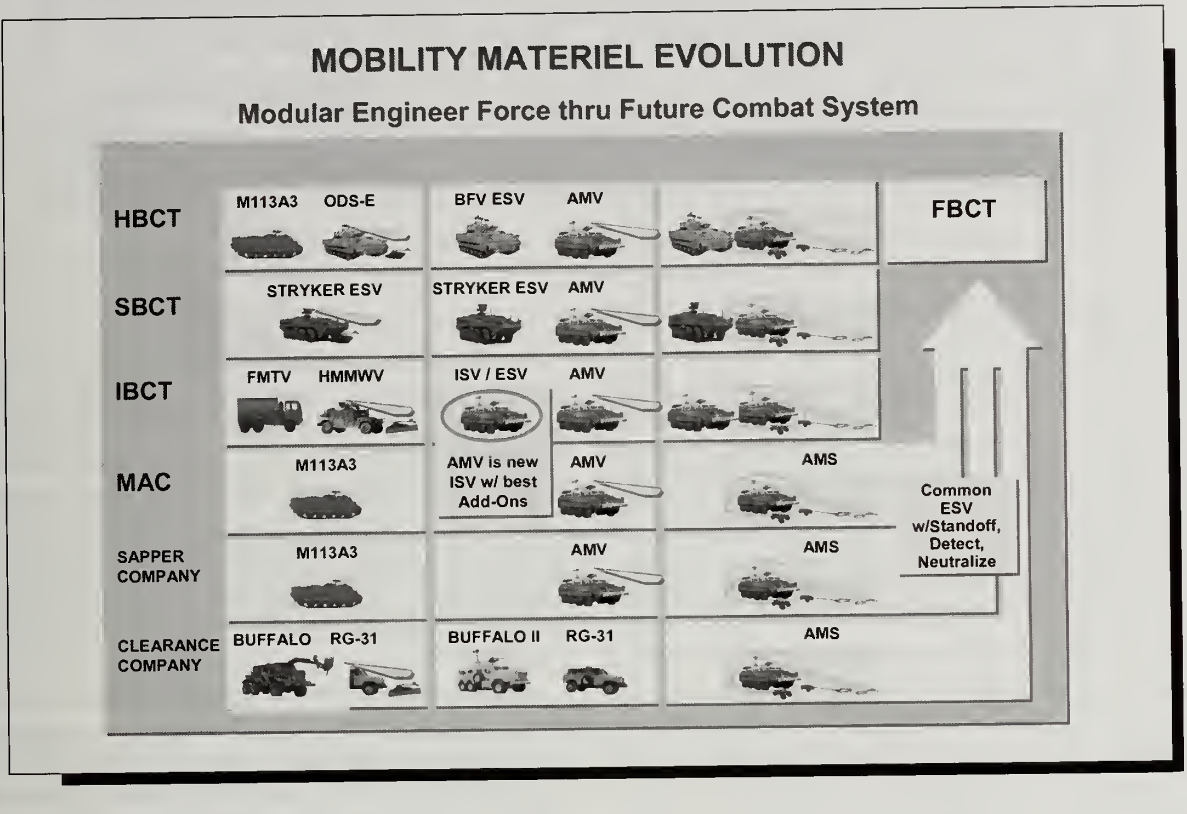
Posture for the Next Transformation

The *third line of operation* is posturing for the next transformation. We must lead our Regiment in the direction of change.

Conceptual Framework. As we examine the direction of the next transformation, we see the Army poised to include the Future Combat System (FCS). The FCS is a highly integrated structure of manned and unmanned air and ground assets, bound by a distributed network acting as a unified combat ground force in the joint environment. The intent of the FCS organizations is to increase its capabilities within this network-centric structure so that forces can conduct their missions within a larger area of responsibility, operate on longer routes, and be proactive and optimized for offensive operations, all the while linked with a common operational picture (COP).

Mobility Materiel Evolution. The assured mobility framework will be just as applicable in these organizations as today. The imperatives and fundamentals will be the foundation for offensive operations. The way we will operate is not that complex. It is a system of systems that feeds information into a single picture for all to see. Our higher headquarters and BCT assets will gather terrain data in the area of operations and report mobility impediments which will be reflected in the COP. Engineers will employ the intelligent mine system and other unattended ground sensors to extend the coverage area for updating the COP. The future Assured Mobility Vehicle (AMV) will operate embedded in BCTs and from the force pool, providing precision detection and neutralization, all the while continuously updating the COP.

The AMV will evolve from our current suite of assured mobility capabilities. Currently, our route clearance teams are a system. We have provided add-on component improvements and provided our sappers with additional add-on skills and tools. As we transition to the Modular Engineer Force, we will have dedicated clearance companies. We will spiral in GWOT technology improvements and continue to provide sappers with improved capabilities. When the Army begins to activate FCS BCTs, we anticipate that we will have a common engineer squad vehicle (the AMV) with standoff detection, neutralization, and marking capabilities integrated with all of the FCS information-sharing systems, making it the Assured Mobility System (AMS). Obviously, there are many technological challenges, but we are making significant progress every day in these areas. Our goal is to field an AMV with all its capabilities inside the heavy brigade combat team (HBCT) engineer search section within the next few years and have it throughout our Regiment's formations by 2015.



MOBILITY MATERIEL EVOLUTION

Modular Engineer Force thru Future Combat System

Modular Support to FCS. The FCS BCT (or future brigade combat team [FBCT]) will still have mobility capability requirements. These requirements include high-resolution geospatial terrain data, gap crossing (wet/dry > 4 meters), neutralization of hazards on- and off-route, neutralization of explosive and nonexplosive obstacles, emplacement of countermobility obstacles, force protection/survivability construction, and stability operations. The modules to support these requirements will come from three sources: division enablers, organic assets of the FCS unit, or the force pool engineer units.

Our Modular Engineer Force organizational design well prepares us for the future and our ability to support the FBCT. Our sapper companies, mobility augmentation companies (MACs), clearance companies, and engineer support companies will be key to providing engineer capabilities to this future force. Our task for the next transformation (FBCTs) is to modernize our materiel systems in these formations. We have already discussed the AMV and AMS; we will also need to develop a lighter assault gap crossing system—a lighter assault breaching vehicle. We will also select certain engineer modules and battalion headquarters to have habitual relationships with these new FBCTs and thus also receive their command and control communications suites.

So, for example, if you need to create an organization to provide high-resolution geospatial products, you can simply reach for a topographic company module or a geospatial planning section. Or say you want to task-organize for stability operations, you could take a clearance company module, a couple of horizontal company modules, and a vertical company module to create an EMF to command and control this organization for stability operations. So what you discover is...we are already transforming to support the next transformation in support of the FCS. Other than continued technological advancements and improved survivability for our engineer equipment, we will continue to task-organize these modules for the foreseeable future. The majority of our force-pooled modules will provide the core of capabilities needed to support the FCS BCTs. These assets will be indispensable to the BCT and division commanders.

Path to Success

I know I have covered a lot of material but...*Is this great or what?!!* The next two years look bright as we move along these three lines of operation. Each path is leading to success for our Regiment, thanks to YOUR efforts. We will continue to support the war and train the force based on your lessons learned. We will continue to complete the transformation and growing the new Regiment; all the while we will be postured for the next transformation. We are almost there! My thanks to all of you who are fighting the war, who are supporting the war, and who made ENFORCE a success this year!

Carry On!

The Essayons Award

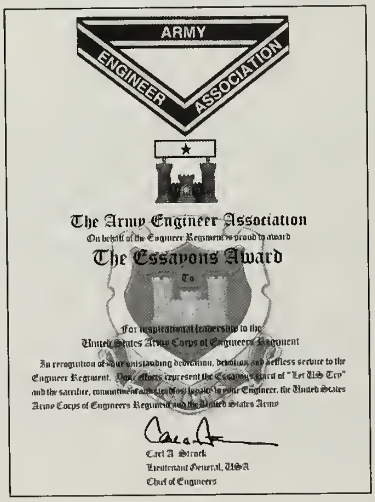
By Lieutenant Colonel Anthony C. Funkhouser

The Army Engineer Association (AEA) unveiled a new award at ENFORCE 2006 to recognize the Engineer spouses of our Regiment. For many years, the deFleury medal has been used to recognize our Soldiers for their contributions to the Regiment. Now we have the *Essayons Award* that pays homage to all the great spouses across the Engineer Regiment. The *Essayons Award* application will soon be posted to the AEA Web site.

The AEA established the *Essayons Award* to honor spouses who have voluntarily made significant contributions to the morale, welfare, and spirit of engineer units and organizations. In order to maintain the value and prestige of the *Essayons Award*, we have established criteria that must be met in order for a nomination to be approved.

- The nominee should be the spouse of an engineer Soldier or engineer Department of Defense civilian.
- The nominee's spouse should be a member of AEA.
- The nominee should be a spouse who has voluntarily provided significant contributions and support to the Engineer Corps, engineer units, engineer families, and/or multiple communities.
- Most importantly, the spouse must possess qualities that set the individual apart from other Engineer Corps spouses or their peers.
- Spouses associated with Active, Reserve, or National Guard units are eligible. Retired individuals are also eligible.

The award **will not** be presented as an "end-of-tour" award that recognizes performance/contributions made during a single assignment. The presentation of the *Essayons Award* to the recipient should be scheduled during very special events such as formal dinners, retirements, and similar affairs.



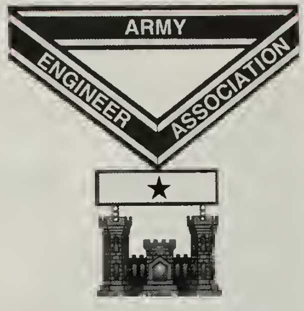
ARMY
ENGINEER
ASSOCIATION

The Army Engineer Association
On behalf of the Engineer Regiment is proud to award
The Essayons Award
To

For inspirational leadership to the
United States Army Corps of Engineers Regiment

In recognition of your outstanding dedication, devotion, and selfless service to the Engineer Regiment. Your efforts represent the Essayons spirit of "Let Us Try" and the sacrifice, commitment and steadfast loyalty to your Engineer, the United States Army Corps of Engineers Regiment and the United States Army

Carl A. Strock
Lieutenant General, USA
Chief of Engineers



The Story of the Essayons Award

The Engineer Regiment presents the Essayons Award to acknowledge our Spouses' outstanding dedication, devotion, and selfless service to the Engineer Regiment. This award honors those who embody the "Let Us Try" spirit and have voluntarily made significant contributions to the morale and welfare of engineer Soldiers and families.

The Essayons Award is rich with symbolism. The Blue Service Star is representative of Army lineage and represents their Soldier's service to country: A blue star (loyalty, sincerity, justice) upon a white field (hope, purity, truth). The red border represents valor and hardiness.

There are three links that connect the castle to the Blue Service Bar, representing the unbreakable bond between the Spouse, the Soldier, and the Regiment.

The medieval castle is inseparably connected with fortifications and architecture. It represents the strong home foundation maintained by engineer Spouses.

The diamond in the center represents the foundation of support to our Soldier. The diamond represents steadfast love. The word "diamond" comes from the ancient Greek word "adamas," meaning unconquerable. The engineer Spouse's spirit is unconquerable and overcomes all challenges they may encounter. Most diamonds have 58 facets, to bring out their maximum sparkle, fire, and brilliance. Engineer Spouses are multifaceted as well in supporting the Soldier, their family, their unit, their community, the Corps of Engineers, and our Army.

The Essayons Award is inscribed on the back with "ESSAYONS." This keeps the Essayons motto near the Spouse's heart.

The Essayons Award is presented to the engineer Spouses who embody this award. They represent the sacrifice, commitment, and steadfastness of the United States Army Corps of Engineers Regiment and the United States Army.

Lieutenant Colonel Funkhouser is the Chief of Staff at the United States Army Engineer School, Fort Leonard Wood, Missouri.

What Is Geospatial Engineering?

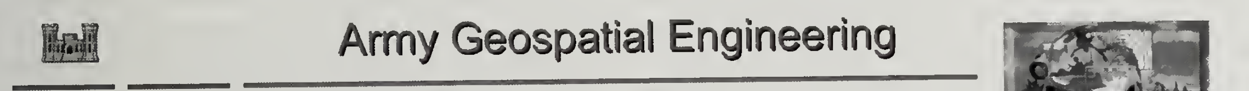
Compiled by Lieutenant Colonel Michael Hendricks, Major David P. Burris, and Master Sergeant Donald Murray

Geospatial engineering is the **art** and **science** of applied geospatial information, from raw or exploited data, about geographic (contextual or spatial) and temporal phenomena related to the earth, its subsurface, its bodies of water, its atmosphere, and immediately adjacent regions of space for military tactical operations.

Within the military decision-making process (MDMP), the **art** of geospatial engineering is the ability to understand the commander's intent, [mission, enemy, terrain and weather, troops available, time available, and civil considerations] METT-TC, and geospatial information available, in order to **evaluate and visualize the battlespace environment** (Step 2 of the [intelligence preparation of the battlefield] IPB). This is then employed to create **geospatial products** and explain the **military significance of the terrain** (Step 2 of the IBP) to the commander and battle staff, enabling operational maneuver, mission planning and rehearsal, training, and precise targeting with the full understanding of the data, including intent of use and limitations.

The **science** of geospatial engineering is the exploitation of geospatial information by the engineer terrain team's use of high-end computer workstations and software to manipulate the data to render spatially co-referenced information about the earth, with temporal tags (metadata), arranged in a coherent structure and format to support military operations, measurement, mapping, visualization, modeling, spatial reasoning, terrain evaluation, and many other applications.

Derived from the Army Geospatial Data Integrated Master Plan (AGDIMP), 29 April 2005


Army Geospatial Engineering
Legacy Force
Army
Corps
Div
Bde
Future Modular Force
Army
Corps/Div
BCT
Geospatial Assets in the Future Modular Force
2 AC, 1 NG x
Engineer Company (Topographic)
8 Officers, 6 Warrant Officers, 177 Enlisted
Geospatial Planning Cell
2 Officers, 2 Warrant Officers, 22 Enlisted
HQ
FMT
CGM x2
Analysis x2
Print x2
Terrain Team
1 Warrant Officer, 8 Enlisted
Terrain Team
4 Enlisted
Geospatial Equipment
•Digital Topographic Support System (DTSS)
•High-Volume Map Production System (HVMP)
•Automated Integrated Survey Instrument (AISI)
Remote Sensing
GPS
Surveying
Geospatial Analysis
Battlefield Visualization
Visibility Products
Support the Warfighter
Image Maps
Mobility Analysis
Geospatial Data
Feature Data
Attributed vector data of map features
Elevation Data
Uniformly spaced grid of terrain elevation values
Multispectral Imagery (MSI)
Imagery from various energy wavelengths
Controlled Image Base (CIB)
Black & white imagery for visualization
Scanned Maps (CADRG)
Scanned paper maps
Paper Maps
Standard topographic paper maps
Information derived from—
•FM 3-34.230, Geospatial Operations
•TC 5-230, Army Geospatial Guide for Commanders and Planners
June 2006

Graphic produced by West Point's Geospatial Science Program, <www.dean.usma.edu/Departments/Geo/GIS>

The Joint Geospatial-Intelligence Activity

By Lieutenant Colonel Richard E. Barrowman

The Soldier stares patiently at the military personal digital assistant (PDA) screen. Although it seems longer, almost 30 seconds have passed since he requested full-motion imagery of the building around the corner. The Soldier has received information from a reliable source that a group of men entered the building carrying material that looked as if it could be used to produce explosives. The Soldier wants the imagery to determine the number of men, which direction they came from, what they were carrying, and other details that only video can provide. The video, in near real time, will be downloaded to him based on his providing a global positioning system grid and time frame. The video—from a Marine unmanned aerial vehicle—is being processed through an Air Force Distributed Common Ground/Surface System (DCGS). After nearly a minute and a half, the video is streaming into his PDA, and he is formulating a plan to attack the building with his squad.

Sound like something out of a television episode? Maybe a futuristic experimental video game? In reality, it's a capability the Joint Geospatial-Intelligence Activity (JGA) intends to facilitate for every warrior in the fight: the timely, multidirectional collection, management, dissemination, and display of geospatial intelligence among national and tactical users.

JGA is a partnership between the United States Joint Forces Command (USJFCOM), United States Strategic Command (USSTRATCOM), and the National Geospatial-Intelligence Agency (NGA) to bring the combatant commands (COCOMs) and services and agencies (CSAs) together to aggregate joint requirements and formulate solutions for capabilities that extend and enhance geospatial support. Geospatial intelligence is the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth.

The geospatial legacy suffers from the fact that geospatial information (maps, charts, and geodetic information) has been functionally managed by "operations," while imagery was managed by "intelligence." Today's joint warfighter support needs to drive these two together. A couple of challenges exist to realizing the full capability of geospatial capabilities. Disparate staff functions are only one. Separate service systems developed without appropriate joint standards and guidance are another, as well as previously unavailable network-centric environment and adequate bandwidth. Additionally, the traditional geospatial data delivery via media (paper and compact disc [CD] or digital versatile disc [DVD]) through the Defense Logistics Agency cannot keep pace with requirements; not all theater geospatial holdings are electronically connected to national holdings; access to imagery products requires knowledge of library and database locations; and operators at the lowest tactical level have limited access to secure communications. Continuing to improve the way we train and fight jointly is now a mandate.

Seeking solutions for enhancing geospatial products, JGA has a special focus on warfighter information needs at the joint task force (JTF) level and below. The organization also ensures that geospatial intelligence collected and produced in theater can be shared effectively within theater with allies and with operational and strategic users.

(Continued on page 16)

GEOPDF MAP FILES

ALL REGIONAL DIGITAL MAPS ON ONE DVD

By Mr. Kenneth R. Bergman and Mr. Raymond G. Caputo

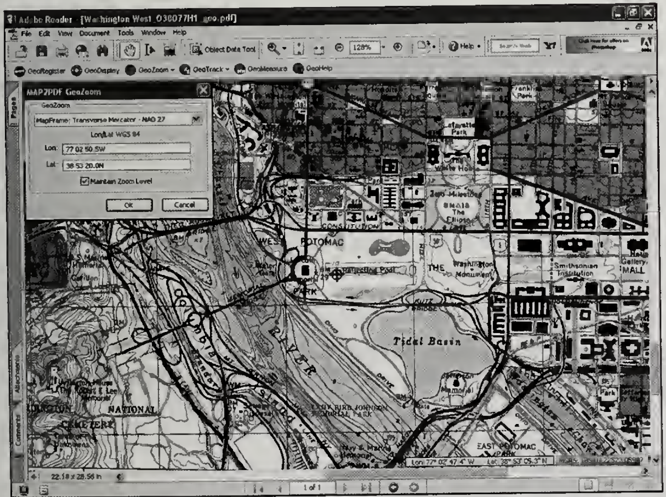
Five years ago the National Geospatial-Intelligence Agency (NGA), in conjunction with private industry, began developing a geospatial portable data format (GeoPDF)—a new Adobe® Acrobat® file format. The GeoPDF provides a more efficient way to use and print digital map displays. NGA is preparing to create GeoPDFs for every map it produces so Soldiers can access maps using the free Adobe Reader® and free third-party plug-in (TerraGo Technologies™ MAP2PDF™) for the Adobe Reader. This technology is being used to make file sizes for electronic map displays much smaller than NGA standard map display files.

The United States Army Engineer Research and Development Center's Topographic Engineering Center (ERDC-TEC) is now using this technology to build Unclassified/For Official Use Only digital map displays for regions of the world where the Global War on Terrorism is being fought. The GeoPDF files are very small (most range from two to ten megabytes per map) and are usable on any personal computer with Adobe Reader and the free plug-in software. The digital display on the computer remains crisp and clear as the user zooms in to look at the map in more detail—unlike Compressed ARC Digitized Raster Graphics (CADRG). The GeoPDF maps can also be printed on letter-size paper (not to scale) or printed to scale on a plotter.

All of the NGA standard maps for an entire country can now be loaded on a single digital versatile disc (DVD) using this technology. These products can be ordered from ERDC-TEC by mail or downloaded through ERDC-TEC's public key infrastructure (PKI) Web access, secure Internet protocol router network (SIPRNET), or the Joint Worldwide Intelligence Communications System (JWICS).

Map Display Technology in Battle Command

Digital map displays have been used for several decades to support battle command systems. Standard formats for digital map displays were developed by the Defense Mapping Agency, now part of the NGA. Geospatial software technology enabled Soldiers to use digital map backgrounds which were stored on compact disc (CD) media and hard drives. One map display format, ARC Digitized Raster Graphics (ADRG), provided a clear view of the scanned map in computer displays, but file sizes were so large that few maps could be loaded on a single CD. CADRG was developed as a new file format using compressed ADRG, with some loss in content, to load more map background files on a single CD, thereby using less hard drive space. CADRG files are much smaller than ADRG, but the digital map display becomes blurry as the user



MapFrame: Transverse Mercator - NAD 27

Lon/Lat WGS 84

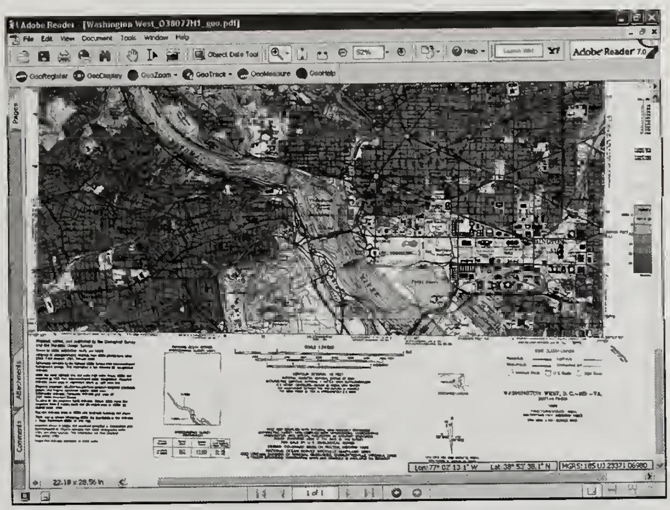
Lon: 77 02 50.5W

Lat: 38 53 20.0N

☑ Maintain Zoom Level

Lon 77° 02' 47.4" W Lat: 38° 53' 05.3" N

Figure 1. Adobe Acrobat GeoPDF map of Washington, D.C., with the latitude and longitude displayed, as well as the Military Grid Reference System (MGRS) coordinates


Adobe Reader - [Washington West_038077H1_geo.pdf]
File Edit View Document Tools Window Help
Object Data Tool
52%
Help
Adobe Reader 7.0
GeoRegister GeoDisplay GeoZoom GeoTrack GeoMeasure GeoHelp
1 of 1

Lon: 77° 02' 13.1" W Lat: 38° 53' 38.1" N MGRS: 18S UJ 23071 06980

Figure 2. The same map, zoomed out with margin information such as scale, legend, and declination constant

zooms in to see more detail. Some users still require the old ADRG format because of the need for better resolution. Both CADRG and ADRG are the primary map background file formats that are used today in most automated battle command systems.

A few years ago, an NGA leader in St. Louis, Missouri, saw the potential for using Adobe Acrobat to create digital map display files that were more useful and accessible than CADRG, with better resolution when users zoom in for a closer look. GeoPDF technology was developed during this period. The resulting GeoPDF file retains the geocoordinates of the map background, as well as marginal features and legend information. GeoPDF files can be readily printed with a desktop printer or to scale with a plotter.

There are two types of GeoPDF files: raster and vector. Both file types provide a scalable display of the digital map with crisp, clear delineation of roads, rivers, contour lines, and other features. The vector GeoPDF has an added function that enables the layers to be turned on and off as needed to analyze a map display based on the user's needs.

Production and Availability of GeoPDF Files

NGA uses GeoPDF technology for a variety of map display applications, but this new format is still a nonstandard product so it was not mass-produced. The ERDC-TEC Operations Division has collaborated with NGA on the development and use of this technology. ERDC-TEC is presently building digital map displays in GeoPDF for required standard NGA maps in theater. ERDC-TEC now produces a series of DVDs that contain all required NGA maps in various regions.

Copies of these GeoPDF products can be obtained by contacting Ray Caputo at 703-428-6784 or <*raymond.g.caputo@erdc.usace.army.mil*> or by downloading GeoPDF files from the ERDC-TEC PKI Web site using a common access card (CAC) at <*https://tsunami.tec.army.mil/Products/MapArchive/*>. The files are also available via SIPRNET at <*www.tec.army.smil.mil/Products/MapArchive/*> and JWICS at <*www.tec.army.ic.gov/Products/MapArchive/*>. NGA GeoPDF files can be obtained via SIPRNET at <*www.nga.smil/products/echart/*> and via JWICS at <*www.nga.ic.gov/products/echart*>.

Mr. Bergman, a member of the Topographic Engineering Center, is assigned to Fort Leonard Wood, Missouri, where he supports the TRADOC Program Integration Office for Terrain Data. A former Marine, he is a Naval Academy graduate and has a master's in systems engineering from George Mason University.

Mr. Caputo is a geographer for the United States Army Corps of Engineers® in the Topographic Engineering Center's Geospatial Information and Imagery Requirements Branch, Alexandria, Virginia. He holds a bachelor's in geography from New York College, Oneonta, New York.

("Geospatial-Intelligence," continued from page 14)

JGA coordinates efforts across the enterprise and focuses on procedures (concept of operations or tactics, techniques, and procedures), data standards, architecture, requirements, and policies necessary to obtain the capabilities to provide integrated geospatial information to the lowest tactical level in the near- to midterm. JGA is following the guidance the Chairman of the Joint Chiefs of Staff provided on 1 October 2005: By changing how we employ the tools already at our disposal, transformation will progress significantly. Consequently, JGA is neither a program nor an acquisition. Rather, it seeks to collaborate among all mission partners to better connect geospatial data from the national to tactical level. The lead on the JGA project says that they are using existing capabilities and technologies to the extent possible. The services have invested a lot of money in their own architectures.

Demand for geospatial intelligence is great and becoming exceedingly more complex. JGA efforts focus on the visualization (display), analysis (value adding), and distribution (dissemination) of geospatial intelligence, following the lead set by the commercial sector to provide better awareness of a geospatial-supported common operational picture. These capabilities enable users to organize, understand, and act upon information gathered and created across the geospatial domain by enhancing the correlation of information data layers in a manipulative framework that assures the user a high degree of geopositional accuracy and flexibility in display.

JGA efforts are based on requirements identified from engagement with COCOMs and services, as well as information from other governmental agencies. The partnership on paper is between USJFCOM and NGA, but in reality, the partnership is broader—involving all the services and COCOMs, as well as supporting agencies like Defense Information Services Agency.

The solution may lead to doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) changes, or it may lead to focusing the efforts of existing programs. JGA is collaborating with existing capability demonstrations within the USJFCOM Joint Experimentation Directorate (J9) and engaging in discussions about future training, optimal architecture, and the necessary data standards for ensuring interoperability and usability of data on different customer sets.

It all goes back to the Soldier outside the building. He needs current, accurate, and competent information. He shouldn't have to worry about source, timeliness, or compatibility of his system. He should focus on the accomplishment of his mission and the prevention of loss of life.

Lieutenant Colonel Barrowman is assigned to the United States Joint Forces Command, Norfolk, Virginia, as the geospatial information and services (GI&S) officer. He works in the J3/44 Engineer Section.

DEVELOPING IGRS

ENGINEERS CREATE THE IRAQ GEOSPATIAL REFERENCE SYSTEM

By Colonel Mark Yenter, Lieutenant Colonel Tedd A. Wheeler, Captain Juan R. Mejia, First Lieutenant Kenneth R. Joyce, and Mr. Michael Cline

A critical component of national infrastructure is an accurate spatial reference system—a reliable network of permanent survey marks that have established horizontal coordinates and/or elevations that are referenced to a defined coordinate system. These survey control stations form the basis of a nation's Geographic Information System (GIS) databases, navigation systems, cadastral records, horizontal and vertical construction surveys, and resource management programs.

Even after the establishment of the global positioning system (GPS), control networks continue to be an essential component to the complicated science of positioning objects on, above, and below the Earth's surface. Surveys must be based on an accurate set of reference stations in order, for example, to lay out a bridge that successfully joins in the middle, or to position a runway on which planes conduct precision approaches.

The 175th Engineer Company (Topographic) (Airborne Corps) arrived in Baghdad in December 2004 to provide geospatial engineering support—including terrain analysis, geodetic survey, and map production—to Operation Iraqi Freedom. While preparing for its first mission in Iraq, the 175th Survey Section discovered that Iraq did not have an established spatial reference system; what data did exist was outdated.

The 175th took the leading role in developing a modern, GPS-based geodetic control network—the Iraqi Geospatial Reference System (IGRS). With technical guidance from the United States National Geodetic Survey (NGS), the 175th engineered IGRS in the likeness of the National Spatial Reference System (NSRS).

CORS Network

The foundation of IGRS is a series of GPS continuously operating reference stations (CORS), spread geographically throughout the country. The CORS network supports postprocessed differential GPS (DGPS) positioning in all regions of Iraq. Given a complete CORS network, a survey crew working to position critical infrastructure features could conduct its survey using GPS with meter-level accuracy. The crew could then download appropriate CORS data from other stations and use it to correct differentially the field data to obtain centimeter-level accuracies for the final product.

Each CORS site consists of a Trimble NetRS® dual-frequency GPS receiver with a permanently mounted antenna that logs position and time data 24 hours a day, 7 days a week. The stations are located at secure installations, and their data transmits through the Internet to a server in Iraq. Trimble's GPS Net® software controls the server, which stores and compresses the incoming data and then sends it via the Internet to NGS for analysis and publication. The dataset also is transferred to the public archives of the International GPS Service (IGS), a global network of geodetic reference GPS and Global Orbiting Navigation Satellite System (GLONASS) (a Russian satellite positioning constellation) reference stations

Photo by First Lieutenant Kenneth R. Joyce

A Soldier installs one of the CORS antennas that is part of the IGRS.

formed by the voluntary cooperation of many worldwide agencies.

NGS calculates the positions of the Iraqi CORS by processing data from each new station with data from a set of "hub" stations that are part of the existing global reference network. Geodesists produce the coordinates with Program for the Adjustment of GPS Ephemerides (PAGES) software that uses the method of "double differences" to remove clock errors in the GPS satellites and the ground stations. Once synchronized time is established, the precise locations of the satellites along their arcs of orbit may be calculated epoch by epoch. The positions of the Iraqi stations are then determined through triangulation by distance to the solved locations of the satellites.

However, GPS satellites circle the Earth's center of mass; therefore, their locations in space, and the resulting triangulation of points on the Earth, are determined in an X, Y, Z Cartesian coordinate system whose origin is located at the Earth's center of mass. Because site coordinates are determined in the reference frame of the GPS orbits, the mathematical Earth model for satellite orbit calculation is all-important, including the slow rate of drift of the Earth's tectonic plates and the features embedded on those plates, such as CORS antennas.

The NNR-NUVEL-1A model is perhaps the best-known model for predicting horizontal plate tectonic velocities for locations outside the United States, usually with an accuracy of a few millimeters per year for locations within stable plate interiors. This model, however, does not make allowance for deformable plate boundaries, such as the boundary between the Eurasian Plate and the Arabian Plate upon which Iraq lies. So the velocities of Iraqi CORS will need to be predicted periodically.

To supplement CORS, the 175th designed a nationwide high-accuracy reference network (HARN) of permanently monumented survey control stations. The goal is to achieve a station spacing of not more than 50 kilometers, which will equal a total network of 200 to 300 stations. Each HARN station consists of a stainless steel rod monument that is driven to refusal with a jackhammer. Stations are positioned with DGPS using as control the nearest active control station—either an established HARN running simultaneous GPS data collection or an Iraqi CORS.

All HARN positions are referenced to the International Terrestrial Reference Frame 00 (ITRF00), which is considered virtually identical to the World Geodetic System 1984 (WGS 84) (G1150) coordinate system.

Aside from various technical hurdles, developing the Iraqi HARN presents a formidable logistical operation. Field teams require constant resupply and protection in order to survive and complete their missions while spread throughout a desert that is extremely hostile. To supplement limited manpower, the 175th partnered with the 42d Engineer Regiment (Geographic), British Royal Engineers.

The American and British surveyors were split into autonomous teams that surveyed the first phase of the HARN, which covers the southern portion of Iraq. Each crew was led by a noncommissioned officer who was responsible for all aspects of his team's safety and completion of technical tasks for the survey. The IGRS Operations Cell synchronized the survey plans and coordinated the task force movements and logistics support. The CORS data are available on an interactive Web page. See *<http://www.ngs.noaa.gov/index.shtml>* and *<http://igscb.jpl.nasa.gov>*. Iraqi HARN data were published on compact disc and distributed throughout the coalition and to the Iraqi ministry of Water Resources, Surveying, and Mapping Center.

Global Outlook

Beyond Iraq's borders, many other developing nations require help with developing modern spatial reference systems. Through progressive outreach programs, NGS has provided equipment and expertise in Central and South America, the Caribbean, and Africa and Eastern Europe to nations that are establishing CORS and HARNs. These efforts have proven particularly effective in nations recovering from natural disasters. War-torn countries require the same geospatial reconstruction, and military engineering units are well-equipped to operate in these regions. By using IGRS as a model to create similar programs in nations like Afghanistan and Somalia, the Army could effectively package what NGS developed as a successful multination technical assistance program into a military reconstruction effort.

Colonel Yenter is the Commander, 20th Engineer Brigade (Combat) (Airborne Corps), and was the director of the Multinational Corps–Iraq (MNC–I), Staff Engineer Section, during Operation Iraqi Freedom, 2004-2006.

Lieutenant Colonel Wheeler is the Commander, 30th Engineer Battalion (Topographic), and senior Iraqi theater geospatial engineer during Operation Iraqi Freedom, 2004-2006.

Captain Mejia was the Commander, 175th Engineer Company (Topographic) (Airborne Corps), during Operation Iraqi Freedom, 2004-2006.

First Lieutenant Joyce was the Executive Officer, 175th Engineer Company (Topographic) (Airborne Corps), and project manager of the Iraqi Geospatial Reference System during Operation Iraqi Freedom, 2004-2006.

Mr. Cline is a geodesist with the National Oceanic and Atmospheric Administration in Silver Spring, Maryland.

Note: A similar version of this article was published in the Society of American Military Engineers publication, *The Military Engineer*, October 2005, and *The American Surveyor*, November 2005.

Speeding Intel to Mapmakers on the Battlefield

The BAS in Iraq

By First Lieutenant Bridget Strom

The Big Agile Server (BAS) is a system created by the Air Force that provides the latest and most accurate map data and imagery to Iraq. The National Geospatial-Intelligence Agency (NGA) is in the process of turning over the server to engineer Soldiers in the Victory Corps, 320th Engineer Company (Topographic), Terrain Platoon. The server will soon be run primarily by engineer Soldiers instead of NGA.

BAS Components

The BAS works by transmitting data, through satellites, from the NGA headquarters in St. Louis, Missouri, to Multinational Corps–Iraq (MNC–I) headquarters in Baghdad. When NGA headquarters receives new map data and imagery, it directly updates the server in Iraq. The ultimate goal of this server is to become the fastest way possible to get map data and imagery to Iraq.

The capacity of the BAS allows users to not only store the most up-to-date imagery and products but also to keep a sizeable amount of data on hand, creating a large directory of map data and imagery to pull from. This is important because it gives geospatial analysts the ability to track progress and change in Iraq, and it builds a comprehensive historical database for future operations.

BAS History in Iraq

The BAS arrived in Iraq in 2005, and it has been an asset used primarily by the NGA. This year, for the first time since its introduction, engineer Soldiers will play a key role in running the server. Currently, NGA is transitioning the BAS to Soldiers in the 320th. This transition allows the terrain platoon to provide leaders at the highest levels the most accurate map products available to the military.

The BAS has been instrumental in the planning and mission execution of most corps sections that frequently request updated products. As a terrain platoon asset, the BAS provides ground commanders with the latest imagery and data on locations across Iraq. The data, transferred from the server to a customer's hard drive, is easily loaded by its users. This technology has been growing since 2003, and to date, the BAS has proved an invaluable asset in the planning and execution of many missions across Iraq.

A terrain platoon Soldier works at the BAS.

BAS Operations – Present and Future

Currently, the 320th Terrain Platoon gets the majority of its data from NGA. And by putting the BAS under the control of the platoon, Soldiers who use the data to make corps-level products will now have complete access to the best data and imagery available. The BAS is quickly on its way to becoming the fastest, most accurate, and most effective way for NGA to get data and imagery to Soldiers in the field. And with Soldiers running the system, it will become an even sharper tool for covering all areas of the battlefield.

First Lieutenant Strom is the terrain platoon leader for the 320th Engineer Company. Her previous assignments include production platoon leader for the 320th Engineer Company and battalion S3 for the 565th Engineer Battalion, Hanau, Germany. Her platoon provides corps-level topographic products and analysis and provides smaller satellite teams across Iraq to the 2d Brigade Combat Team, 28th Infantry Division, Corps Support Command, and the 130th Engineer Brigade.

WINNING THE ECONOMIC FIREFIGHT-
TRANSLATING RECONSTRUCTION INTO COMBAT POWER

By Colonel Christopher J. Toomey

As our Army deals with insurgencies in Iraq and Afghanistan, it is becoming ever more apparent that the precise application of infrastructure development and reconstruction can markedly contribute to the overall success of our operations. This becomes extremely important as operations transition from military to nonmilitary centers of gravity; at some point, the traditional military effort becomes subordinate to more inherently nonmilitary tasks. Then it becomes more than just winning the fight on the battlefield, but also about winning hearts, minds, and even pocketbooks. It is about winning the "economic firefight."

While conducting operations in Iraq and Afghanistan, our forces are continually exposed to crumbling and dysfunctional infrastructure that inhibit both establishing effective democratic governance and producing the economic revitalization necessary to ensure secure and stable environments. Inextricably linked, governance, economic revitalization, and security impact each other and together spiral upward or downward. As we face an enemy that exploits any weakness in our own forces and leverages dissatisfaction and hesitation in the civilian population, all of our tools are needed to create effects—outcomes—along these three lines of operations. The interrelationship of each capability—kinetic and nonkinetic, inherently military or not—must be both understood and exploited for maximum effect.

Considered long overdue by many, Department of Defense Directive 3000.05[1] elevated stability, security, transition, and reconstruction (SSTR) operations and propelled what was often regarded as secondary military roles into the mainstream of military operations—no longer the isolated purview of civil affairs, engineers, and military police units. Indeed, SSTR operations are both combined arms and interagency operations that require a degree of effects coordination that are arguably as complex as more traditional combat operations.

Terrestrial infrastructure—roads, bridges, power, and water resources—is in many ways the physical embodiment of a mature and functioning society. Their development facilitates economic revitalization and security. Coupled with good governance and reinforcement of rule of law, a sound infrastructure can promote trade and instill confidence in a nation's populace. By doing this, it can work with other more traditional capabilities to help defeat the enemy. Infrastructure development erodes support for the enemy by instilling a sense of material confidence in the ability of the legitimate government to deliver services. If the government can provide improved roads and reliable power, then the enemy's message that they offer "something better" becomes measurably less credible.

Afghan workers are an integral part of all reconstruction operations.

Infrastructure development also presents an attractive economic alternative to the population—a population that the insurgency needs for support. If power systems bring light industry and irrigation promotes greater crop yield, then the local populace is less inclined to either support insurgent forces or engage in illicit activity. Improved road networks extend and promote commerce and serve as direct economic stimuli and reduce the conditions where an insurgency can gain recruits.

When people have a stake in their community, they are less inclined to take action that will set them back. Carefully executed with an eye on building local buy-in and promoting ownership, infrastructure development serves to engender a greater democratic community spirit.

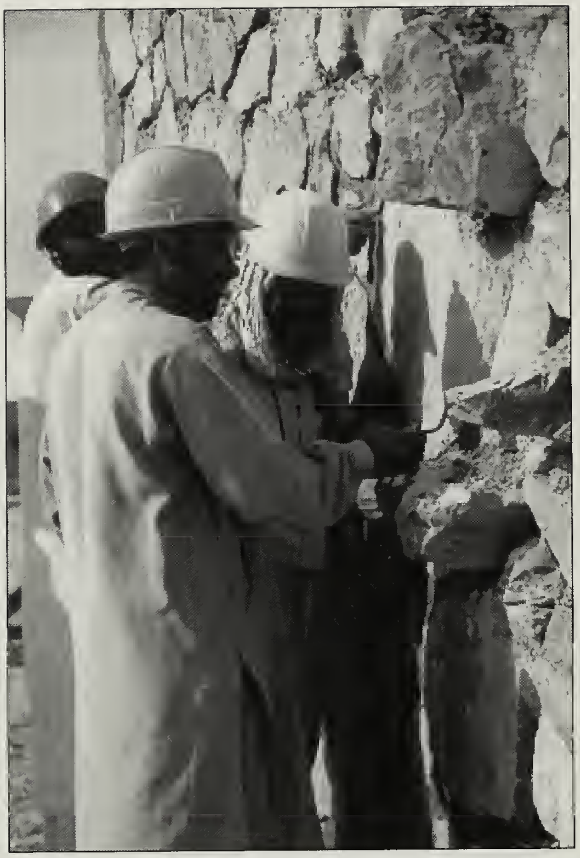
With a destroyed road network, minimal reliable power, dysfunctional water management, and a retarded internal capacity for development and sustainment, Afghanistan, perhaps more than Iraq, represents a country with a devastated infrastructure. Immature to begin with, it shows the pain of more than 25 years of near continuous conflict. While combating an active insurgency, U.S. and coalition forces are taking advantage of an excellent opportunity to effectively win the economic firefight and establish protocols for developing infrastructure as a complement to more traditional forms of combat power.

In approaching reconstruction in Afghanistan, U.S. and coalition forces of Combined Forces Command–Afghanistan (CFC-A) are employing a mix of assets—to include Provincial Reconstruction Teams, funding from the Commander's Emergency Response Program (CERP), and military engineers—while following four broad principles to getting the most out of their efforts:

- Maintain a coordinated, precision approach to selecting projects.
- Win local consensus and ownership while planning projects.
- Build local capacity as a key residual of project execution.
- Synchronize with kinetic and information operations throughout.

Working with the United States Embassy, the United States Agency for International Development (USAID), and other United States Government agencies within the context of a broader international effort—to include governmental donors, as well as a multitude of others—it is imperative that CFC-A's efforts are coordinated in order to minimize duplication of effort and to make sure the right area is targeted at the right time with the right effort. Given that not all ministries within the Afghanistan government are currently capable of providing direction and focus to the international community and that no one single body oversees coordinating infrastructure development in the country, CFC-A must aggressively work to deconflict its efforts with others. Through a series of forums such as CFC-A's Strategic Infrastructure Joint Planning Group, the development of an accepted infrastructure common operating picture (COP), to include a common infrastructure database format, was an essential step. By maintaining this dialogue across the international community, CFC-A can influence the time and location of stakeholder activity. Deliberately, CFC-A looks to directly engage in those areas where sizeable donor activity is absent, while focusing on high-payoff targets in contentious areas that will most benefit from reconstruction efforts with a residual contribution to enhancing security. For example, much of the international donor community is focused on improving the more than 6,000 kilometers of paved, national-level roads. However, there is only marginal activity in addressing the roads heading toward

Active mentoring of Afghan firms brings new skills, such as surveying.



Local construction techniques by local firms help ensure community buy-in.

the provincial capitals and district centers. CFC-A is targeting improving these roads while focusing on volatile areas that need the economic benefit derived from improved roads and simultaneously improving the access for security operations.

Ensuring local consensus and ownership dramatically enhances the impact of the reconstruction effort and its ability to deliver the effect. Working through the local Provincial Reconstruction Teams that are tied into the provincial and district leadership, CFC-A looks to engage the leadership at all levels, determining what needs to be done and where it needs to be done. Key stakeholders include the Community Democratic Councils that are formed under the Government of Afghanistan's National Solidarity Program to provide grass roots input to community and infrastructure development while advancing democratic government. Local buy-in not only ensures that the community accepts the work, but it also greatly assists in increasing the likelihood that the community—often through the use of local firms—actually contributes to the execution of the particular project. Even in contentious areas, project security is enhanced if the community believes that they have a stake in its success and if locals are employed. By maintaining an "Afghan face" on any project, it gains greater overall acceptance.

Both in direct action and as a residual of the infrastructure development, capacity building—the capability of the government, community, and people to sustain themselves—must be considered. This includes everything from human capital (training and education) to corporate development to local governmental reform. Each and every project in CFC-A is seen as an opportunity to build capacity. This is done by employing local Afghans and establishing construction training programs, either on the job or as deliberate efforts. Additionally, the use of local firms requires a good degree of mentoring and training at the commercial level. Local companies are guided in construction estimates, scheduling, quality control, and safety standards. Using expertise found in the United States Army Corps of Engineers®, CFC-A is willing to accept a degree of inefficiency in construction practices while building this capacity. At the governmental level, CFC-A is helping build the governmental wherewithal to sustain what's been built and forecast for the future.

In seeking an outcome with the enemy, effects-based operations encourage the synchronized impact of both military and nonmilitary capabilities in achieving the commander's intent. Synchronizing reconstruction efforts with both information and kinetic operations optimizes their impact in contributing to the overall effect. The effects community within CFC-A is developing a marketing strategy to leverage reconstruction to promote many of the command's key themes and messages. In synchronizing with kinetic operations, reconstruction timing and placement is aligned to not only deconflict the battlespace but also to present reconstruction efforts as an attractive alternative to those who may be the direct or indirect targets of combat power. The use of well-validated vehicles such as a joint effects working group contribute markedly to delivering the necessary synchronization.

Looking toward the future, it is clear that the line between combat and reconstruction operations will continue to become ever more indistinct. It is necessary that our Army continues to improve how it conducts reconstruction operations so that it can stay relevant to the nation's needs. In doing this, it will draw on the lessons of both the past and today to improve for the future and ensure that it is ready for any test. In Afghanistan, CFC-A is pushing to increase the significance of reconstruction operations in order to take the campaign to the next level and win the economic firefight.

Colonel Toomey commands the Afghanistan Engineer District in Kabul. He commanded the 555th Combat Engineer Group and 555th Maneuver Enhancement Brigade (Provisional) from 2003 to 2005.

Endnote

[1] Department of Defense Directive 3000.05, *Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations, 28 November 2005.*

Military Transition Teams

By Captain Andrew D. Swedberg

Since the beginning of Operation Iraqi Freedom, the United States has been searching for an exit strategy from Iraq. The withdrawal of U.S. forces must be timely, but must not be premature and allow the failure of the new Iraqi security forces. The military transition team (MiTT) concept is a method to meet both goals. A MiTT consists of 10 to 12 Soldiers embedded with an Iraqi army division, brigade, or battalion. Each team is led by a field grade officer—usually a colonel for a division, a lieutenant colonel for a brigade, and a major for a battalion. The remaining team members are a mix of officers and noncommissioned officers (NCOs) from varying branches and experiences. All MiTT members teach, mentor, and operate with the Iraqi army unit that they are attached to. As the Iraqi army gains combat power and logistical support, it assumes more of a role in counterinsurgency operations.

Each team covers all warfighting functions. MiTT members are chosen as subject matter experts in their field, to teach the Iraqi army our techniques. These positions include a team chief and experts in maneuver; mobility, countermobility, and survivability; intelligence; logistics; and communications, as well as various assistant positions. However, as the teams began working with new Iraqi units, it became apparent that a conventional staff would be more effective and realistic than teaching skills from the respective branches. One team had the following staff positions:

- A field artillery lieutenant colonel (team chief)
- A field artillery major (executive officer)
- An engineer captain (S1)
- A military intelligence major (S2)
- A military intelligence captain (assistant S2)
- An infantry major (S3)
- A field artillery captain (assistant S3)
- A quartermaster captain (S4)
- A signal corps sergeant (S6)
- A field artillery staff sergeant (noncommissioned officer in charge [NCOIC])

Training Phases

Training consisted of four main phases, after which each team would become a MiTT, a Special Police Transition Team (SPTT), or a Border Transition Team (BTT). A MiTT would be embedded with the Iraqi army anywhere throughout the country. An SPTT would be embedded with the Iraqi special police force and would have a vital role in transforming the newly formed Iraqi police into a capable fighting force. A BTT would be stationed along the borders of Iran, Jordan, and Syria. They would be pivotal in securing Iraq's borders against terrorists from other countries. Team members came from all over the Army. Their command—the Iraqi Assistance Group—is a newly formed U.S. unit.

Phase One

The first phase, a fast-paced 15-day program at Fort Carson, Colorado, focused on learning the latest tactics, techniques, and procedures (TTP) from Iraq. The training included close quarters combat, room clearing procedures, improvised explosive device (IED) identification, and convoy procedures.

Phase Two

The MiTTs went to Kuwait for the second phase, where they continued training while acclimating to the hot climate. The 10-day training focused on advanced rifle marksmanship, traffic control point and entry control point operations, convoy operations, and the latest IED trends.

Phase Three

For the third phase, all of the teams flew to Taji, Iraq, for a 5-day cultural awareness program. They were introduced to the Arabic language and Iraqi customs, food, beliefs, and history. The complexity, risk, and importance of the mission became very apparent and more understandable. (The United States had a similar advisory program during the Vietnam War when U.S. Soldiers coached the South Vietnamese army on operations.) The success of this mission will be the Iraqi army's success, which will lead to U.S. withdrawal from Iraq.

Phase Four

The fourth phase was at Camp Victory in Baghdad. All MiTTs received final briefings and prepared for departure to their Iraqi army units. They received some guidance from General George W. Casey Jr., the commander of all coalition forces in Iraq. He referenced T.E. Lawrence (Lawrence of Arabia) in saying: *"Do not try to do too much with your own hands. Better the Arabs do it tolerably than that you do it perfectly. It is their war, and you are to help them, not win it for them."* Some teams stayed close to Baghdad, while others traveled far north to the Mosul area. Upon arriving on location, each team was assigned as many as three interpreters. The interpreters, usually from Iraq, learned English from various sources, ranging from American movies to studying at a university. They were paramount to success in advising the Iraqi army.

Iraqi Training

One MiTT was attached to the Iraqi 1st Brigade, 7th Division. Known as the "Defenders of Baghdad," the unit consists mostly of Shias who supported Saddam Hussein's removal from power. By far, most Iraqis wanted Saddam gone from power; only a few of his close supporters wanted him to stay and control the country. Imagine living where an invading army would not be considered an enemy, but welcomed and supported.

During the team's stay in Fallujah, it instituted a basic training program, a junior officer course, and a staff-focused training course. Marching, marksmanship, teamwork, and discipline were topics in the basic training program. The junior officer course highlighted troop-leading procedures, the importance of planning, and leadership. The staff course focused on teamwork, how to conduct a meeting, the duties of each staff section, and a general introduction to the military decision-making process.

While many new Iraqi soldiers had no experience in the military, many higher-ranking officers served under Saddam's regime for more than 20 years. In a brigade or battalion staff section in the old Iraqi army, very little authority was given to NCOs. Furthermore, staff sections did not hold thorough planning sessions for any upcoming operation. Most of the time, a brigade commander or higher would have supreme decision-making authority, and the staff sections would have very little input into decisions. This system is essentially the opposite of ours where NCOs are empowered to train and mentor Soldiers, and all staff sections have the ability to weigh in on a command decision. This concept was introduced to the Iraqi staff, and guidance continued throughout the year. After training for three months, the 1st Brigade, 7th Division—along with the MiTT—relocated to Ar Ramadi, a hotbed of insurgency in the western Al Anbar province.

In Ar Ramadi, the Iraqi brigade was partnered with a U.S. brigade combat team, and three subordinate Iraqi battalions were partnered with U.S. battalions. Each Iraqi battalion also had an attached MiTT. Each MiTT and its Iraqi unit were under the tactical control (TACON) of a U.S. division, brigade, or battalion. The attached MiTT was under the administrative control (ADCON) of a higher or lower MiTT. Orders would come through the U.S. brigade to an Iraqi unit for execution. In time, the Iraqi army will be capable of issuing orders to its own subordinate units without U.S. involvement.

A MiTT literally lives with the Iraqi army—often eating Iraqi food, sleeping in close proximity to the Iraqi soldiers, and teaching them our work ethic and problem-solving methods. Some teams have a separate building close to the Iraqi unit headquarters and work with the Iraqis during the day, but have time away during the evening. Each MiTT has similar experiences. Most Soldiers who have deployed know about forward operating bases (FOBs). The Iraqi army also has FOBs, usually sharing a common wall with a U.S. Army FOB. While most U. S. forces in Iraq never enter an Iraqi FOB, a MiTT considers it home.

Cultural Differences

Although we had learned of cultural differences between the Arabic and American cultures, we could not imagine these differences until we experienced them firsthand. While most business meetings in the American culture (and especially the U.S. Army) are quick, with few digressions, meetings in the Iraqi army are nearly the opposite. It has the same structure, such as in a command and staff meeting, but the method of business is much different. The Iraqi culture puts emphasis on personal relationships and respect, often considering relationships over professional qualities. Iraqis are influenced by religious, tribal, ethnic, and political allegiances, unlike most cultures found in America. Timeliness is also not an issue. If a meeting is scheduled for 0900, the Iraqi officers might arrive between 0855 and 0920. When one officer enters, all the others stand and greet him, which usually involves kisses on each cheek. This severely disrupts the continuity of a meeting. We learned that these acts were not intended to be disrespectful, nor were they bad, but were simply different. Many similar customs permeate their culture.

We soon discovered a fine line between advising the Iraqis to change their army to our model and adapting our own techniques to better fit their customs and formats. The appropriate action was often an opportunity for each culture to learn more about the other. The Iraqi soldiers and staff were very respectful and impressed with MiTT members; simply being an American Soldier assigned to work with them carried a lot of weight. The two armies have never worked closely together before; we are paving the way toward preparing the Iraqi army to be capable of securing its country. Iraqi army and police units now control large portions of the country, run checkpoints, and conduct raids and searches. The Iraqi ability and capacity to control subordinate units has progressed in the last three years.

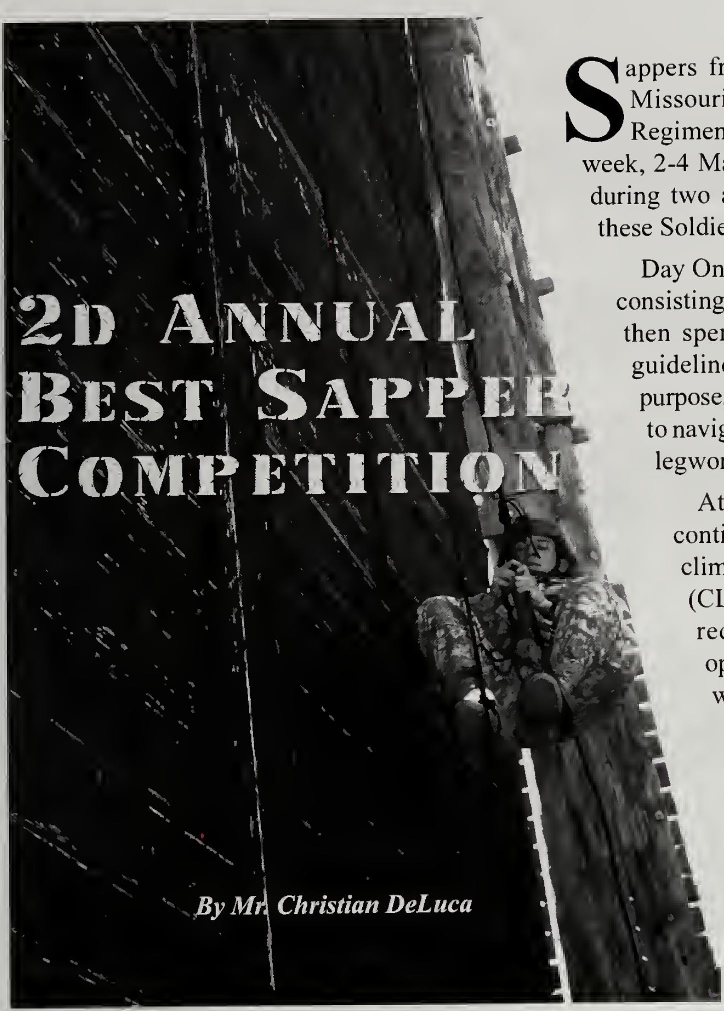
Iraqi Capabilities

Before the teams began helping the Iraqi army, it conducted business as we did many years ago. The brigade had one desktop computer, but no Internet capability or telephone connectivity. They relied on handwritten documents sent by courier. On payday, Iraqi soldiers lined up to receive their pay. The MiTT concept allows team members to be a liaison between Iraqi units that are otherwise unable to communicate. A brigade S1 advisor can assist on

(Continued on page 27)

2D ANNUAL BEST SAPPER COMPETITION

By Mr. Christian DeLuca



Sappers from around the globe traveled to Fort Leonard Wood, Missouri, to see who was the best of the best at the Engineer Regiment's 2d annual Best Sapper Competition, during ENFORCE week, 2-4 May 2006. Ten 2-man teams traversed through post terrain during two and a half days of the most strenuous training many of these Soldiers had ever experienced.

Day One began at first light, with a modified physical fitness test consisting of sit-ups, push-ups, pull-ups, and a 3-mile run. The teams then spent 30 minutes packing their gear; were briefed on the guidelines and boundaries; and set loose lugging 65-pound all-purpose, lightweight, individual, carrying equipment (ALICE) packs to navigate to 16 checkpoints, culminating in more than 20 miles of legwork within 24 hours.

At eight of the checkpoints, teams completed tasks before continuing on their route. These tasks consisted of a Prusik climb and buddy rappel, weapons assembly, a combat life-saver (CLS) assessment and 9-line medical evacuation (MEDEVAC) request, demolition calculations, grenade toss, military operations on urbanized terrain (MOUT) breach, and various weapons firing.

Day One ended for all teams with a 500-meter swim across Bloodland Lake after constructing a poncho raft from equipment in their packs. The last team finished the swim around 0730 the next day. According to one 20th Engineer Battalion Soldier from Fort Hood, Texas, after only one day of the competition, it had been a hard experience.

Top: **A Soldier from the 20th Engineer Battalion uses the Prusik technique to ascend a tower.**

Left: **A team from the 66th Engineer Company finishes a swim across Bloodland Lake after constructing a poncho raft.**

2006 Best Sapper Competition Winners		
First Place	Second Lieutenant Joseph Byrnes Staff Sergeant Jeffrey Goodman	66th Engineer Company Schofield Barracks, Hawaii
Second Place	Second Lieutenant Christopher Bolz Sergeant Peter Allen	Echo Company, 2-9th Infantry Battalion Camp Casey, Korea
Third Place	Second Lieutenant Casey Eckart Specialist David Roberts	20th Engineer Battalion Fort Hood, Texas
Physical Fitness Test	Second Lieutenant Travis Brown Sergeant First Class Marcus McClain	82d Engineer Battalion Germany
CLS 9-Line MEDEVAC Evaluation	Second Lieutenant Travis Brown Sergeant First Class Marcus McClain	82d Engineer Battalion Germany
MOUT Breach (Tie)	Second Lieutenant Christopher Bolz Sergeant Peter Allan Second Lieutenant Joseph Byrnes Staff Sergeant Jeffrey Goodman	20th Engineer Battalion Fort Hood, Texas 66th Engineer Company Schofield Barracks, Hawaii
Steel Cutting Charge Evaluation	Second Lieutenant Joseph Byrnes Staff Sergeant Jeffrey Goodman	66th Engineer Company Schofield Barracks, Hawaii
Timber Cutting Charge Evaluation	Second Lieutenant Joseph Byrnes Staff Sergeant Jeffrey Goodman	66th Engineer Company Schofield Barracks, Hawaii
Grenade Range Qualification	Specialist Jeron Pilger Specialist Jack Ramthum	20th Engineer Battalion Fort Hood, Texas
Demolition Calculation	Second Lieutenant Christopher Bolz Sergeant Peter Allan	20th Engineer Battalion Fort Hood, Texas
Mine Identification	Second Lieutenant Christopher Bolz Sergeant Peter Allan	20th Engineer Battalion Fort Hood, Texas
Prusik Rappel Knots Evaluation	Second Lieutenant Casey Eckart Specialist David Roberts	20th Engineer Battalion Fort Hood, Texas
Counter Force Evaluation	Staff Sergeant Jason Beals Specialist Matthew Wienczowski	Echo Company, 2-9th Infantry Battalion Camp Casey, Korea
9-Mile Run	Second Lieutenant Colby Krug Staff Sergeant Erasmo Flores	66th Engineer Company Schofield Barracks, Hawaii
AN/PSS-12 Mine Detector Evaluation	Second Lieutenant Colby Krug Staff Sergeant Erasmo Flores	66th Engineer Company Schofield Barracks, Hawaii
Poncho Raft Swim	Sergeant William Stanley Private Gilbert Cunningham	Bravo Company, 1st Engineer Battalion Fort Riley, Kansas
Weapons Range Qualification	Sergeant William Stanley Private Gilbert Cunningham	Bravo Company, 1st Engineer Battalion Fort Riley, Kansas
Weapons Assembly/ IED 9-Line MEDEVAC Evaluation (Tie)	Staff Sergeant Jason Beals Specialist Matthew Wienczowski Second Lieutenant Christopher Bolz Sergeant Peter Allan	Echo Company, 2-9th Infantry Battalion Camp Casey, Korea 20th Engineer Battalion Fort Hood, Texas

A team from the 1st Engineer Battalion tapes C4 to a piece of lumber during a demolition event.

Two and a half hours later and two teams smaller, Day Two began. With packs back on their backs and boots back on the trail, the teams began another 20-mile-plus trek, stopping at six more checkpoints to complete tasks. The chief of training of the Sapper Leader Course stated that the lack of downtime was intentional due to wanting to achieve more of a continuous 24-hour operation to make it more realistic.

The competition ended on Day Three with a 9-mile run. Teams carried sandbags and water jugs during parts of the run, adding to the strain. One Soldier from the 66th Engineer Company, Schofield Barracks, Hawaii, remarked that the event was fun, but that it was an extremely challenging experience.

Mr. DeLuca is a photojournalist with the Fort Leonard Wood newspaper, the Guidon. He served as a combat correspondent with the United States Marines from 1997 to 2001. He is a graduate of the Basic Journalism Course and the Intermediate Photojournalism Course at the Defense Information School, Fort Meade, Maryland, and holds a bachelor's in film studies.

Photos by Mr. Christian DeLuca

("Transition Teams," continued from page 24)

payday and report discrepancies to the higher headquarters via telephone or e-mail.

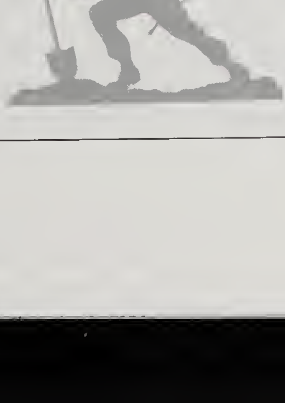
Each MiTT had two field ordering officers who bought items for the team and, more importantly, the Iraqi unit they were partnered with. Throughout the year, the Iraqi unit received new laptop computers, new weapons, and up-armored high-mobility multipurpose wheeled vehicles (HMMWVs). With each new equipment shipment, it became important to train Iraqi soldiers to use the items correctly. One big task was to teach the Iraqi staff to use Microsoft® Word®, PowerPoint®, and Excel®. They began to use these programs in command and staff meetings, much like the U.S. Army does. Furthermore, weapon ranges and driver training programs were arranged to train the troops on weapons and vehicle safety and operation.

Conclusion

As Iraqi army units learn to successfully command and control their subordinate units, they will be given greater ownership of their operational environment. This power shift is vital to the U. S. drawdown in Iraq. Much like any deployment, there were low points and high points, but all were memorable. Witnessing Iraqi soldiers vote in the December 2005 Iraqi election was truly an unforgettable day. More somber memories will remain, however, including the effects of suicide bombers, IEDs, and insurgents.

The MiTT experience is unlike any other military assignment. Iraqi soldiers are motivated to make a difference in their country. As more Iraqi divisions, brigades, and battalions stand up and take over, more U. S. forces will be relieved of their duties in Iraq. It is a tough fight, but challenges are overcome every day. Iraqi units throughout their entire army are learning about the work ethic, professionalism, and prowess of the U. S. military. Their army and police force are growing tremendously and continue to gain greater control of the country. Through the training the Iraqi army has received—and will continue to receive—from the U.S. Army, Iraq will be able to mitigate the difficult insurgency.

Captain Swedberg is the commander of Alpha Company, 169th Engineer Battalion, Fort Leonard Wood, Missouri. He has served two tours in Iraq, the most recent as a member of a MiTT in Ar Ramadi. He holds a bachelor's from the United States Military Academy and a master's from the University of Missouri-Rolla in Rolla, Missouri.



CONTINGENCY BASE CAMP WORKSHOP

By Mr. Michael Wolford

In early May 2006, the United States Army Engineer School and the United States Military Academy (USMA) cohosted the 3d annual Contingency Base Camp Workshop in St. Louis, Missouri. The workshop was held during ENFORCE week to emphasize the importance of contingency base camps to the engineer mission. Participants were divided into one of three focus areas for the workshop: the Base Camp Knowledge Management System, Initiative 18, or Infrastructure Assessment.

Base Camp Knowledge Management System

The Base Camp Knowledge Management System, designed to be a Web-based knowledge portal for base camp planners and managers, was developed by the USMA using input from previous base camp workshops as a guide for management system requirements and capabilities. The system was developed to address the lack of a secure, fully integrated means of sharing information and transferring knowledge with other members of the base camp management community. The knowledge management system for base camps will provide an expeditious means for planners, designers, operators, and managers of base camps to share their knowledge. It will provide the process to develop and enforce methods for sharing operational information and conversion of data and information to actionable information, as well as eliminating or reducing information stovepipes among operational elements.

Initiative 18

Initiative 18—from the Chief of Staff of the Army's task force on stability and reconstruction—establishes and provides base operation capabilities to support the operational Army in a contingency environment and city management expertise to support the host nation. The base camp workshop addressed the base operations support aspect of the initiative, specifically addressing the recommended course of action from the Initiative 18 Working Group that was sponsored by the United States Army Corps of Engineers® (USACE). The course of action discussed the establishment of a proponent for contingency base camps. The Army has 303,000 Soldiers deployed to 120 different countries to support the Global War on Terrorism. Department of Defense Directive 3000.05, *Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations,* states that stability operations are a core U.S. military mission that the Department of Defense shall be prepared to conduct and support. Critical in the support of SSTR operations is that deployed contingency operations will require base camps. While doctrine developers often think in terms of deployed forces being at the "tip of the spear," the fact is that the tip of the spear needs to be correctly joined to the shaft. That joining point for Soldiers currently deployed is the base camp, where at the end of the day's fight, they link back into the logistics and support systems that prepare them for the next mission.

Currently, the process to address base camp issues is done on an ad hoc basis, depending on the mission, operational area, and scale of operations. Combatant commanders divert their energy and resources to addressing base camp planning, design, and functionality—which are often outside the scope of their mission emphasis and in many cases should have been completed before establishment of the base camp. The present system is a sum of several parts controlled by different organizations, including—

- Research, Development, and Engineering Command (RDECOM) (United States Army Natick Soldier Center)
- United States Army Combined Arms Support Command (CASCOM) (Quartermaster)
- United States Army Materiel Command (AMC) (Logistics Civil Augmentation Program [LOGCAP])
- USACE (Forward Engineer Support Team [FEST], Environmental Support Team [EnVST], Contingency Real Estate Support Team [CREST])
- Engineer Command (ENCOM) (Facility Engineer Detachment [FED]/Facility Engineer Group [FEG]/Facility Engineer Team [FET])

Without an overarching proponent, coordinating resource challenges can result in insufficient preplanning, design shortcomings, operational issues, and the lack of an established research and development program to seek solutions proactively and quickly as operational gaps are identified. These factors can be compounded by extended operational requirements. Currently there isn't a base camp proponent. The Initiative 18 course of action recommends to the Chief of Staff of the Army that the Engineer School be the proponent for contingency base camps. This would include the formation of an integrated concept development team, with representatives from all organizations that provide support for the individual systems that make up base camps. Workshop participants agreed with the recommended course of action and provided additional recommendations for participation in an integrated capabilities development team (ICDT) to be developed by the proponent.

Infrastructure Assessment

The infrastructure assessment group discussed several topics. Workshop participants stated that units want a capability to go to a possible base camp site, obtain critical information, and pass this information back to planners. Two equipment kits were discussed in detail: the Handheld Apparatus for Mobile Mapping and Expedited Reporting (HAMMER$^{\text{TM}}$) and the Engineering Field Planning, Reconnaissance, Surveying, and Sketching Set (ENFIRE). Both have the capabilities to provide the necessary support to assessment teams.

HAMMER

HAMMER is a ruggedized, handheld field computer for collecting geospatial data with high-resolution digital instrumentation. The device is a product of a cooperative research and development agreement between the Construction Engineering Research Laboratory and Surveylab, Ltd. The product seamlessly integrates and synchronizes a global positioning system, laser distance meter, digital camera, compass, inclinometer, geographic information system (GIS), and handheld computer. This allows users to quickly capture a rich array of geospatial and attribute data, annotated with images and text, such as capture and review a target position and photo, add attribute data to the feature, review and add photos, and view the new feature on a map. The instrument's database stores and shares data, and the automated GIS-based system facilitates data analysis, interpretation, and reporting. HAMMER will be demonstrated and field-tested this year.

ENFIRE

ENFIRE is a prototype system focused on enabling Soldiers to conduct reconnaissance on routes, bridges, and minefields by replacing the current surveying sketch kits with digital reconnaissance forms that match currently used hard-copy forms to facilitate data collection. ENFIRE supplies Soldiers with software and hardware tools to gather reconnaissance and reporting information, project management tools, a digital library of field and technical manuals, construction project building-design software, construction site terrain-modeling tools, an inventory management package, and tools to disseminate information to the Army Battle Command System battlefield functional areas. ENFIRE was demonstrated at Fort Leonard Wood, Missouri, in May 2006.

Conclusion

Overall, it was a very successful base camp workshop with much being accomplished in the breakout sessions. Several issues and actions were raised and will be addressed. Results and follow-up actions will be posted to the Base Camp Knowledge Management System Web site. The next base camp workshop will be held during the next ENFORCE. For information concerning the 2006 Annual Contingency Base Camp Workshop or future workshops, contact Mike Wolford at (573) 329-1927 or <*michael.wolford1@us.army.mil*>.

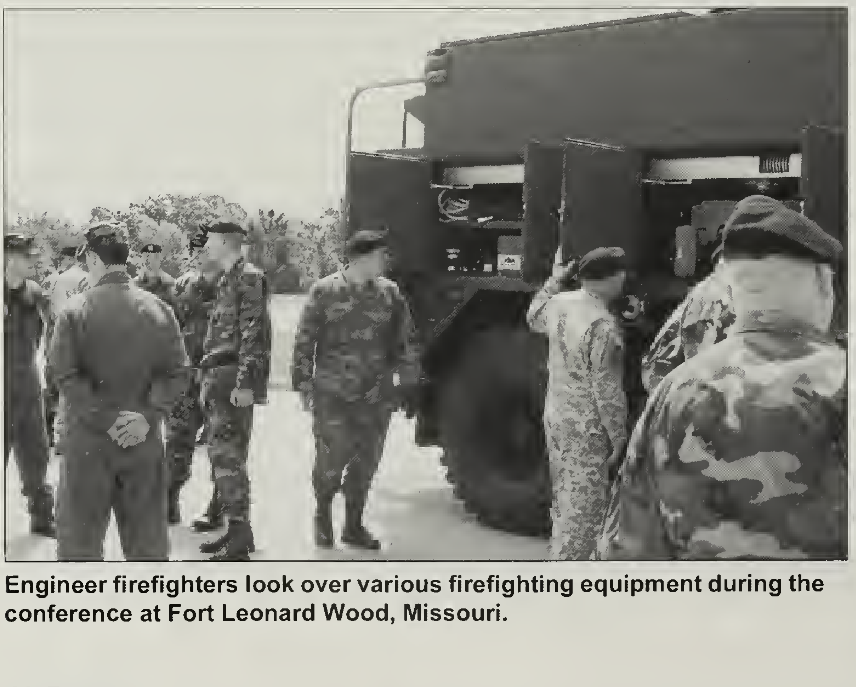
Mr. Wolford is an environmental training specialist for the Directorate of Environmental Integration at the United States Army Engineer School, Fort Leonard Wood, Missouri. He recently retired from the Army after more than 24 years of service. He holds a bachelor's in environmental science from Drury University, Springfield, Missouri, and is currently working on a master's in environmental management from Webster University, St. Louis, Missouri.

MILITARY FIREFIGHTERS HOST CONFERENCE

By Ms. Allison Choike

Soldiers who call themselves 21 Mikes, or Army firefighters, gathered at Fort Leonard Wood, Missouri, in late May for a conference to discuss current issues that affect military occupational specialty (MOS) 21M. For three days, Soldiers talked about equipment, continuing education, the firefighter role in homeland security, and the future of firefighters in the Army. Conference attendees received updates on the status of Active Army units and information on new equipment that is available. Those attending the conference got a hands-on view of a new tactical vehicle—the Tactical Fire Fighting Truck (TFFT)—the Army is now using to combat fires and other emergency situations. The TFFT gives firefighters the ability to do more, according to the deputy chief of the 369th Engineer Battalion in Pennsylvania, who has three of the trucks.

The conference consisted of more than demonstrations and hands-on experiences. It helped put all Army firefighters on the same sheet of music, allowing units that don't have certain types of equipment to see what others have done and changes that have been made or need to be made to equipment. The conference also allowed them to discuss issues, along with their possible solutions.



Engineer firefighters look over various firefighting equipment during the conference at Fort Leonard Wood, Missouri.

The conference took place at the United States Army Engineer School, with various visitors and speakers from Fort Leonard Wood and engineer units from other locations. The conference served as a way for Soldiers from the Active Army, United States Army Reserve, and Army National Guard to compare how they approach their daily duties as firefighters. The participants looked at their experiences and shared that knowledge. There are some changes coming in the future, and they were also able to provide input about those changes.

Ms. Allison Choike is a photojournalist with the Fort Leonard Wood newspaper, the Guidon.

Canal Renovation

By Specialist Spencer J. Case

Thanks to the Soldiers of the 84th Engineer Battalion (Combat) (Heavy), more than 1,100 Iraqis living near Logistics Support Area (LSA) Anaconda will have access to water needed for drinking, raising crops, and watering livestock. The 84th used excavating equipment to clear a stretch of canal near LSA Anaconda in February 2006. The segment has been under the control of coalition forces and off limits to Iraqis since the beginning of the war.

The necessity of fixing the canal came to the attention of U.S. troops when a civilian bicultural advisor, working with the Civil Affairs Office of the 3d Corps Support Command (COSCOM), received a call that a group of Iraqis with a backhoe had shown up—unannounced—at the north entry control point (ECP) of the LSA. The Iraqi group consisted of an engineer, two farmers, and a representative from the Iraqi government who had come to maintain a neglected junction in the canal that needed to be fixed before the beginning of the growing season in late February.

Soldiers use a SEE to clear a canal of debris.

The civilian advisor returned to the site with a security patrol to determine what kind of engineering effort it would take to allow at least some water to flow. He reported that the water in the canal was stagnant and covered with water bottles, concertina wire, and other trash. Realizing the potential humanitarian benefit of cleaning the canal, the advisor contacted the Civil Affairs Office of the 3d COSCOM. After surveying the area, the project was delegated to the 84th Engineer Battalion.

On 11 February, Soldiers arrived to clean the canal, equipped with a dump truck, a hydraulic excavator (HYEX), and a small emplacement excavator (SEE). They used the SEE to move trash away from narrow areas and then scooped it up with the HYEX. At times, temporary dams were created so the Soldiers would have a dry area to work. The number of Soldiers working on the project fluctuated depending on the number of dump trucks needed.

Although the Soldiers of the 84th had two weeks to restore the water to the Iraqi farmers, they completed this within just a few days (see article on page 32). They dredged up about 40 truckloads of stinking, black sludge and hauled it away for disposal, resulting in a deeper canal with clean, flowing water.

The Iraqis got the water they needed to survive and farm, the 84th Engineer Battalion Soldiers gained experience with their excavating equipment, and the 3d COSCOM built a relationship where the Iraqis understand that we're really trying to help them.

Specialist Case is a public affairs specialist for the 207th Mobile Public Affairs Detachment. He is a graduate of the Basic Public Affairs Specialist-Writer course at the Defense Information School, Fort Meade, Maryland.

Bridging the Canals

By First Lieutenant Waukemsha Kirkpatrick

The traffic pattern of civilian dump trucks delivering gravel to the Logistics Support Area (LSA) Anaconda's north entry control point (ECP) proved to be a constant problem. The trucks blocked the guards' field of vision and posed a serious threat of vehicle-borne improvised explosive devices (VBIEDs).

To solve this problem, the force protection team of LSA Anaconda's mayor cell and the 2d Battalion (Air Assault), 44th Air Defense Artillery, developed a plan to reorganize the gravel stockpile area and reroute dump trucks by upgrading two access roads and building bridges across two parallel canals south of the north ECP. The canal water, used by Iraqi farmers to irrigate their crops, would need to be blocked in order to complete the project.

The Project

The Horizontal Platoon and 2d Platoon of Bravo Company, 84th Engineer Battalion, were assigned the mission with the provision that it must be completed in two weeks in order to restore the water to the canals for the Iraqi farmers.

The Horizontal Platoon was assigned the excavation portion of the project—to design and upgrade the existing roads, providing an entrance and an exit road to the stockpile area. The 2d Platoon took charge of the construction portion of the project—to construct the headwalls for the culverts and timber bridges. Before the platoons could begin, the battalion commander required a solid plan for the project and that 100 percent of the materials be on hand. The plan developed by the platoons' leadership called for three teams of Soldiers to place culverts, the road surface, and a timber bridge at each of the sites.

The Challenges

From the beginning of the project, the platoons faced several challenges involving the availability of materials, submerged project sites, emplacement of the culverts, and construction of the bridges.

Materials

The availability of materials proved to be a challenge throughout the project. After requesting the bill of materials, the platoon discovered that some of the critical materials were not available on LSA Anaconda. Once all materials were gathered, the 2d Platoon began the construction portion.

Submerged Sites

Initially, the excavation portion of the project consisted of site preparation and surveyor support to emplace grade stakes. The Horizontal Platoon finished the excavation and site preparations, and the day before construction was to begin, the local farmers opened a valve to increase the canal's water flow. As a result, the project sites and the preparation work lay submerged, setting the project back with a new requirement to pump out the excess water.

The leadership called on local contracting support for assistance. Once the contractors pumped out the water, the Horizontal Platoon again excavated the sites, and the surveyors came out to place grade stakes. At the same time, the bridge team set up site security, dug footers, and set rebar and bolts for concrete placement. The Horizontal Platoon also prepared the ground by filling and compacting the earth canal. The ground was still spongy after the site preparation, so Soldiers tamped the ground with hand tampers until it was sufficiently compacted.

Culvert Emplacement and Bridge Construction

To continue placing the culverts and building headwalls, the Horizontal Platoon made a breach from the earth canal to the concrete canal, allowing water to flow without hindering the project (see article on page 31), and the initially inflexible timeline became somewhat flexible. From the beginning, the Soldiers had pushed to complete the project within the allotted two weeks. But since Iraqi farmers restored water to the canal before the project began, the leadership decided to divert the water instead of blocking it, so they no longer were challenged by the two-week time constraint.

The culvert teams prepared the sites by tamping the ground, squaring off the forms, and placing a rebar cage in the prepared site. While waiting for the concrete to cure, they prepared for the placement of steel culverts.

An M1114 HMMWV and an M917 20-ton dump truck cross one of the newly contructed bridges across the two canals at LSA Anaconda.

The Horizontal Platoon loaded the prefabricated culverts onto a trailer and hauled them out to the sites. Once the 2d Platoon placed mortar onto the concrete footers, the Horizontal Platoon used the crane to lower the culverts into position on top of the mortar, and Soldiers firmly packed in the mortar for culvert stability.

The next task included building the formwork for the headwalls and tailwalls. The culvert teams completed the formwork for the lower lift and placed concrete for the culverts, while the bridge team cut timbers and predrilled holes for placement on the bridge footers.

Building the formwork for the second lift took a little more time than the first lift. To prevent the forms from separating, causing a concrete blowout, the platoon sergeant ensured that the culvert teams did not rush building the formwork. They assembled four rebar cages (which required a lot of cutting and tying wire), connected the cages to the first lift, and built the formwork with plenty of bracing for the second lift. Meanwhile, the bridge team placed timbers onto the bridge footers and bolted them down. The bridge team also predrilled holes in the timbers to be used as girders on the bridge.

After removing the formwork from the headwalls and tailwalls, the culvert teams constructed the formwork for the wingwalls and farside bridge approach ramps. The bridge team placed decking and fascia onto the bridge. The Horizontal Platoon filled and compacted between the culverts and headwalls and tailwalls at both sites to prepare for the road surface, and then the 2d Platoon placed the final concrete for the road surface and nearside approach ramps.

The 2d Platoon finalized the cosmetic work on the bridges, which completed the construction portion. The Horizontal Platoon compacted and graded the approaches and began work on the final phase of the excavation portion—building up the existing road. The Horizontal Platoon filled and compacted the existing road and placed a gravel cap to meet the height of the bridge at each site.

Summary

Placing two culverts in an earth canal and building two timber bridges required attention to detail and a lot of hard work to ensure that the project was successful. But the water flows in the earth canal once again, while dump trucks have a new entrance and exit to the gravel stockpile area. The Soldiers of the 84th Engineer Battalion were able to positively impact both the Army and the Iraqi communities without disturbing the Iraqi way of life.

First Lieutenant Kirkpatrick is a platoon leader for the Vertical Platoon in Bravo Company, 84th Engineer Battalion. Her previous assignments include direct support platoon leader for Headquarters Support Company, 84th Engineer Battalion. She is a graduate of the Officer Candidate School.

Dedication

The following members of the Engineer Regiment have been lost in the Global War on Terrorism since the last issue of *Engineer*. We dedicate this issue to them.

Corporal J. Adan Garcia	1st Brigade Special Troops Battalion, 10th Mountain Division	Fort Drum, New York
Private First Class Caleb A. Lufkin	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Specialist Bryan L. Quinton	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Staff Sergeant Gavin B. Reinke	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Private First Class Joseph I. Love	84th Engineer Battalion, 8th Sustainment Command (Theater)	Schofield Barracks, Hawaii
Private First Class Alva L. Gaylord	Charlie Company, 110th Engineer Battalion	Kansas City, Missouri
Specialist Michael L. Hermanson	Alpha Company, 164th Engineer Battalion	Minot, North Dakota
Sergeant Kevin D. Akins	Alpha Company, 391st Engineer Battalion	Asheville, North Carolina
Specialist Joshua L. Hill	Alpha Company, 391st Engineer Battalion	Asheville, North Carolina
Staff Sergeant Joseph R. Ray	Alpha Company, 391st Engineer Battalion	Asheville, North Carolina

Command and Control of a Heavy Engineer Task Force

By Second Lieutenant Joseph P. Morsello

When the 505th Engineer Battalion deployed to Iraq in October 2005, it was attached to the 555th Engineer Brigade under the 101st Airborne Division (Air Assault). The 505th's missions were throughout north-western Iraq, resulting in decentralized employment of elements into a multidisciplinary task force—Task Force Morsello (TFM). The process for requesting engineer support did not allow for an immediate response to the needs of the warfighter. Due to enemy action, the warfighter was unable to wait for mission directives to reach the task force in the field. TFM incorporated three command and control techniques that allowed effective response to the needs of the Soldier on the ground: task force organizational structure, a mission-oriented approach, and freedom of action.

Organizational Structure

The executing elements were organized for specific missions, and tasks and equipment were anticipated for the accomplishment of these missions. TFM was composed of horizontal and vertical elements with maintenance and medical support. Personnel consisted of heavy equipment operators, truck drivers, battalion medical support personnel, and mechanics. The traditional hierarchical structure of the Army was flattened, establishing a high degree of flexibility and responsiveness.

Mission-Oriented Approach

In November 2005, TFM was sent to Forward Operating Base (FOB) Summerall to construct a new entry control point (ECP) and provide general force protection support. The task force acted according to a mission-oriented approach rather than a mission-directed approach to provide effective support to the warfighter in the field. Having direct contact with the customer, it was able to respond to the request for engineer support with elements ready to execute within hours of receiving the task. As new FOB mission tasks—outside the original ECP mission directive—were executed, they were included in daily status reports to company and battalion commands.

Joint planning with Headquarters and Headquarters Company (HHC), 187th Infantry Regiment, ensured that existing project plans were modified and the customer's requirements were met. More importantly, TFM's fluid response had a direct impact on supporting warfighters on the ground in the Bayji area. The task force succeeded in accomplishing seven simultaneous missions and still completed the north ECP ahead of the original schedule.

TFM places barriers around the Muhallabiyah Police Station perimeter.

TFM Soldiers patrol the streets near the Biaj guard towers using M1 Abrams tanks.

Carrying this mission-oriented approach into FOB Sykes, TFM became a highly autonomous unit because the 3d Armored Cavalry Regiment (3ACR) was very receptive to this type of operational technique. The 3ACR regimental engineer informed them of requested engineer assets from units in the field and gave his intent based on the requests. TFM then conducted a reconnaissance of the project site, gathered the customer's requirements, and wrote the statement of work (SOW). The SOW and the request for engineer support were reviewed by the regimental engineer and submitted to the 555th through the 101st.

Modifications to the original SOW for ongoing and follow-on missions followed the usual process for requesting engineer support. Under the 3ACR, the process was executed quicker. The SOW was then written, in cooperation with the customer, for the new requirements. Written directives were ready within a few days, allowing planning to begin on future projects. The usual project management administrative needs were addressed as engineer assets were diverted for immediate-need missions and SOW modifications. The schedule was quickly updated and passed up the chain of command and, most importantly, the customer understood the impacts on existing projects, such as time delays and assets diverted for other missions.

Freedom of Action

The efficient execution of TFM's mission pipeline at both FOB Summerall and FOB Sykes was greatly facilitated by its freedom of action at the task force level. Task force personnel knew the intent of their leader and customer, allowing them freedom to overcome design and on-site work issues as projects progressed. Work never stopped because their leader was unavailable when questions or problems arose. Inclusion of the senior E5s and select E4s in the reconnaissance and planning process provided invaluable technical expertise. Select personnel were also part of the development of the SOW and design process, enabling task force personnel to have a personal stake in the project's objectives and schedule. This allowed junior NCOs to have significant freedom of action. They knew the project's goal, final product, and intent.

TFM's decentralized operation methods contributed to its ability to improvise. The task force always performed its own reconnaissance and, through on-site inspections, determined equipment needs and potential problems.

Conclusion

The task force organizational structure, mission-oriented execution, and multiechelon freedom of action allowed many tasks and projects to be executed in parallel. Task force organization allowed the custom building of a tailor-made force that met specific mission requirements, ensuring that the right equipment, operators, and support were available when needed. Additionally, TFM was able to integrate elements from the 43d Engineer Battalion, 3ACR, and 425th Transportation Company during the Muhallabiyah Police Station project. Acting according to the mission intent to provide effective support to the 187th and 3ACR, rather than specific written mission directives, allowed an immediate response to the needs of the Soldiers on the front lines of the counterinsurgency. Accomplishing this was a direct result of joint planning with the customer. TFM's joint planning and responsiveness to the customer's needs eliminated any fears that directed operations would derail. The task force operated with a considerable amount of freedom to conduct reconnaissance and execute missions. The reconnaissance pull methodology, in combination with conducting its own recons, allowed detailed planning and the efficient flow of work through the project pipeline.

Second Lieutenant Morsello is the direct support and company maintenance platoon leader, Headquarters Support Company, 505th Engineer Battalion, Gastonia, North Carolina. He was previously the engineer equipment platoon leader, Headquarters Support Company, 505th Engineer Battalion. He holds a bachelor's in managerial accounting from Pace University, Pleasantville, New York, and a master's in liberal studies from North Carolina University, Raleigh, North Carolina.

Photo by Specialist Spencer J. Case

Bosnian Troops Assist With UXO Removal in Iraq

By Specialist Spencer J. Case

A decade after civil war left thousands of unexploded bombs scattered throughout their homeland, troops from the newly consolidated army of Bosnia and Herzegovina are helping coalition forces dispose of unexploded ordnance (UXO) in southern Iraq. Just last year, two separate armies functioned in Bosnia and Herzegovina—the Army of the Federation of Bosnia and Herzegovina and the Army of the Republic of Serbia.

Last year also saw the birth of explosive ordnance disposal (EOD) as a career field in the Bosnian army after the troops completed training with contractors. Despite the fact that they are relative newcomers in the world of EOD experts, U.S. military leaders have been impressed by the Bosnians. They are safe, productive, and professional in the way they perform their mission.

In Iraq, the mission of the Bosnian unit is to supplement civilian contractors in identifying, removing, and safely detonating UXO in an area where a weapons stockpile was hastily destroyed by exploding it. The initial explosion destroyed most of the weapons; however, it flung miscellaneous bits—called *kick-outs*—over a 13-square-kilometer area. These kick-outs pose a threat to the local population and coalition troops.

Photo by Specialist Spencer J. Case

EOD specialists with the army forces of Bosnia and Herzegovina uncover an artillery round during their munitions sweep.

As citizens of a war-torn country, the Bosnian troops have seen—firsthand—the devastation wrought by UXO. This gruesome knowledge makes their mission intensely personal. Several Bosnian children have lost their lives or their limbs because they were playing with items such as the scattered kick-outs. Every mine and UXO removed and destroyed is potentially a life or a limb saved.

In March, the Bosnian EOD unit dismounted from their vehicles to form a semicircle around the deputy commander of the mission. They listened attentively as he gave a briefing, running through a list of security and safety procedures in their native language. When the briefing was over, the troops formed a line that resembled a standard police call for trash, scouring the ground for anything resembling a bomb. Some of the shells were obvious, while with others, only the tip of a cone or a bent fin protruded from the soil to warn the Bosnians to step carefully.

The fact that the explosives had been exposed to the elements for so long also made the Bosnians' job more hazardous. The molecular structure of the explosives could have changed over time, with the exposure to sunlight, moisture, and other conditions. As that process occurs, the explosives can become more stable or unstable than they were originally.

As the Bosnians comb the desert, U.S. Soldiers stand lookout to prevent children and sheep-herding Bedouins from entering areas that have not been cleared. This scene shows the tremendous progress of the Bosnians in the last few years and gives hope to Iraq following the same path to a unified and independent country.

Once a sector was cleared, the UXO was transported by the Bosnians to a blasting area nestled between two dirt hills and placed on the ground beside a crater. The detonations are spectacular, creating mushroom clouds that resemble atomic explosions. The smell of burning phosphorous is a pungent, biting scent that becomes pleasant over time with the realization that there will be—at least from those explosives—no loss of life or limb.

Specialist Case is a public affairs specialist for the 207th Mobile Public Affairs Detachment. He is a graduate of the Basic Public Affairs Specialist-Writer course at the Defense Information School, Fort Meade, Maryland.

Regimental Awards

Each year, we recognize the best engineer company, lieutenant, noncommissioned officer, and enlisted Soldier—in each of the components—for outstanding contributions and service to our Regiment and Army. Every engineer unit in the Regiment can submit the name and achievements of its best of the best to compete in these distinguished award competitions. Only the finest engineer companies and Soldiers are selected as recipients of these awards. The Soldiers will carry throughout their careers the distinction and recognition of being the Engineer Branch's best and brightest Soldiers and leaders. Following are the results of the 2005 selection boards for the Itschner and Outstanding Engineer Platoon Leader (Grizzly) Awards, the Sturgis Medal, and the Van Autreve Award:

Active Army

Itschner Award: Echo Company, Task Force 4-64 Armor Brigade, 3d Infantry Division, Fort Stewart, Georgia.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Patrick Sullivan, Alpha Company, 864th Engineer Battalion, Fort Lewis, Washington.

Sturgis Medal: Sergeant First Class Roderick Jones, Bravo Company, 864th Engineer Battalion, Fort Lewis, Washington.

Van Autreve Award: Specialist Jonathan T. Lapage, Echo Company, 2d Battalion, 69th Armor Regiment, Fort Stewart, Georgia.

United States Army Reserve

Itschner Award: Headquarters Support Company, 844th Engineer Battalion, Knoxville, Tennessee.

Outstanding Engineer Platoon Leader (Grizzly) Award: No nomination.

Sturgis Medal: Sergeant First Class John L. Krell, Headquarters Support Company, 844th Engineer Battalion, Knoxville, Tennessee.

Van Autreve Award: Specialist Mark R. Olson, Headquarters Support Company, 844th Engineer Battalion, Knoxville, Tennessee.

Army National Guard

Itschner Award: Alpha Company, 224th Engineer Battalion, Burlington, Iowa.

Outstanding Engineer Platoon Leader (Grizzly) Award: Second Lieutenant Nicholas P. Jones, Bravo Company, 224th Engineer Battalion, Ottumwa, Iowa.

Sturgis Medal: Sergeant First Class David R. Zulaica, Alpha Company, 224th Engineer Battalion, Burlington, Iowa.

Van Autreve Award: Specialist Brandon T. Layne, 201st Engineer Battalion, Ashland, Kentucky.

The award recipients were recognized at ENFORCE 2006, 1-4 May 2006, at Fort Leonard Wood, Missouri.

Photos by United States Army Corps of Engineers

Need Engineering Help?

Contact the EI2RC

By Lieutenant Colonel Joseph K. Miller

You are the engineer for your deployed unit and are tasked, for example, with rebuilding the infrastructure, power grid, road network, and water and wastewater treatment systems for a destroyed town in Iraq or with providing a design for a high-altitude river crossing in Afghanistan. Or perhaps you are supporting a maneuver unit at a training center, or deploying to assist after a natural disaster and you need designs, cost estimates, geographic information system (GIS)-interactive maps, or flood analyses in a short suspense and do not have the staff on hand to handle the request. What can you do to get the mission accomplished?

The Engineering Infrastructure and Intelligence Reachback Center (EI2RC), a United States Army Corps of Engineers® (USACE) asset located in Mobile, Alabama, has managed more than 1,000 requests from deployed engineers since 2003. Under field-force engineering (FFE) doctrine, USACE harnessed the expertise of 35,000 nondeployed engineers in order to support deployed engineers around the world.

Customers who contact the EI2RC include Army, Navy, Marine Corps, and Air Force personnel and members of the Federal Emergency Management Agency (FEMA) and the United States Department of State. The EI2RC supports the Global War on Terrorism, civil-military deployments worldwide, relief efforts for natural disasters (such as Hurricane Katrina), and combatant commander (COCOM) training exercises.

So how does this "reachback concept" work? Customers submit a request for information (RFI) to the EI2RC via unclassified or classified Web site, e-mail, video teleconference (VTC), or telephone. An RFI is a request for technical assistance that requires FFE funding and approval. RFIs include—but are not limited to—infrastructure assessment; GIS; base camp design; entry control point (ECP) design; environmental assessment; antiterrorism/force protection design; water and wastewater treatment system design; electrical design and analysis; route analysis and bridge military load classification; bridge and dam repair; dam breach/flood analysis; intelligence analysis; disaster relief support; and airport, port facility, railroad, and roadway design/repair.

Upon approval of the RFI, the EI2RC gives it a tracking number and assigns it to a Base Development Team (BDT), laboratory, school, private sector organization, design center, or Mandatory Center of Expertise for resolution. A BDT is a multidisciplined team of engineers from the Baltimore, Tulsa, Louisville, Alaska, Mobile, Little Rock, New England, Seattle, Fort Worth, and Honolulu districts who are on call on a weekly rotational basis. Laboratories consist primarily of the United States Army Engineer Research and Development Center (ERDC) and the TeleEngineering Operations Center (TEOC) located in Vicksburg, Mississippi. An EI2RC staff member serves as a project manager for the RFI until the customer is satisfied with the delivered product.

Customers can submit an RFI through the EI2RC unclassified Web site at <*http://ei2rc.usace.army.mil*> or classified Web site at <*http://ei2rc.usace.army.smil.mil*>. If Internet connectivity is unavailable, customers can use nonsecure Internet protocol router network (NIPRNET) e-mail to <*CEEI2RC@usace.army.mil*> or secure Internet protocol router network (SIPRNET) e-mail to <*OrgMbox CEEI2RC@usace.army.smil.mil*>. They can also submit an RFI via unclassified or classified VTC or call us at commercial (251) 690-2039 or DSN (312) 457-2039.

Lieutenant Colonel Miller is the operations officer for the USACE Reachback Center. A graduate of Texas A&M University, College Station, Texas, he is an infantry officer who served in Iraq in 2004-2005 and was awarded the Combat Action Badge.

2006 Army Deployment Excellence Awards

By Mr. Charles K. Ledebuhr

Competitive year 2006 proved to be another stellar performance of the Deployment Excellence Award (DEA) Program, with great units and installations setting the pace in deployment operations. The Army's operational tempo, coupled with increased awareness of the DEA program, resulted in the largest level of participation ever. The program saw significant gains, particularly in the operational, supporting, and installation categories.

This year's award ceremony was held at the Hilton Alexandria Mark Center on 18 May 2006. Army Deputy Chief of Staff, G4, Lieutenant General Ann E. Dunwoody presented the awards to all of the honored units. The Army Assistant Deputy Chief of Staff, G3, Major General Michael W. Symanski, and the Commanding General, United States Army Transportation Center, Brigadier General Mark Scheid, assisted in the presentation of awards.

General Benjamin S. Griffin, Commanding General, United States Army Materiel Command, provided remarks at the banquet and challenged units and installations to maintain their high deployment standards. Before the ceremony and banquet, unit representatives had the opportunity to tour the Pentagon, the Capitol, and the National Mall.

In the DEA program, Army units compete by component (Active Army, United States Army Reserve, and Army National Guard) in categories of large unit (battalion and above), small unit (company and below), and supporting unit. Installation and operational deployment categories are Armywide. The operational deployment category is open to all Army units that deploy on operational missions like the Global War on Terrorism and peacekeeping. Units can contend for either the large-unit or small-unit award. The Army's up-tempo and strong major command (MACOM) involvement brought a number of new units and installations into the competition.

The Installation Management Agency had the best showing ever with the largest number of installations competing. The winner for the second year running was Fort Hood, Texas. Its outstanding support to nine overlapping deployments, coupled with the challenges of dealing with Hurricane Katrina and Hurricane Rita, resulted in an extremely strong showing.

In a very close competition, Fort Bragg, North Carolina, a newcomer to the competition, was the runner-up in the installation category. The Fort Bragg installation team received strong endorsements from its diverse customer base and demonstrated its outstanding capabilities to support scheduled and no-notice deployments.

The Military Surface Deployment and Distribution Command swept the Active Army supporting-unit category with the 832d Transportation Battalion, Jacksonville, Florida, winning and the 838th Transportation Battalion, Rotterdam, Netherlands, coming in a close second.

Eighth United States Army, Korea, a winner last year in the operational deployment category, continued to excel with the 305th Quartermaster Company, Yongsan, Korea, winning the Active Army small-unit category and the 728th Military Police Battalion, Daegu, Korea, being selected as runner-up in the Active Army large-unit category.

The United States Army Network Enterprise Technology Command had its first winner with the 40th Signal Battalion from Fort Huachuca, Arizona, winning the Active Army large-unit category.

The Army Reserve had a number of outstanding entries, including Headquarters and Headquarters Company (HHC), United States Army Civil Affairs and Psychological Operations Command at Fort Bragg, which was recognized as the best Reserve supporting unit. The command formed movement support teams with internal assets and supported a complex operation involving 19 different special operations units, 1,200 Soldiers, and 160 short tons of cargo. The teams ensured that deploying Army Special Operations Forces met deployment timelines, prepared timely and accurate movement data, and properly used transportation assets.

The National Guard also had some standout units, including Joint Force Headquarters, Florida National Guard, St. Augustine, Florida. The headquarters, selected as the National Guard's best supporting unit, supported the deployment of 29 units and 1,800 Soldiers in support of the Global War on Terrorism, while simultaneously conducting military support to civil authorities during four major hurricane recovery operations.

The 2007 DEA competition is now open for Active Army, United States Army Reserve, and Army National Guard units and installations. To participate in the DEA program, a unit is required to have executed or supported a training or contingency deployment during the competition year. All units and installations are encouraged to plan now to compete in

2006 Deployment Excellence Award Recipients		
Category	**Winner**	**Runner-Up**
Active Army Large Unit	40th Signal Battalion Fort Huachuca, Arizona	728th Military Police Battalion Daegu, Korea
Active Army Small Unit	305th Quartermaster Company Yongsan, Korea	HHC, 5th Special Forces Group Fort Campbell, Kentucky
Active Army Supporting Unit	832d Transportation Battalion Jacksonville, Florida	838th Transportation Battalion Rotterdam, Netherlands
United States Army Reserve Large Unit	483d Transportation Battalion Vallejo, California	1190th Deployment Support Brigade Baton Rouge, Louisiana
United States Army Reserve Small Unit	828th Quartermaster Company Wilkes Barre, Pennsylvania	401st Transportation Company Battle Creek, Michigan
United States Army Reserve Supporting Unit	HHC, United States Army Civil Affairs and Psychological Operations Command Fort Bragg, North Carolina	643d Area Support Group Fort Polk, Louisiana
Army National Guard Large Unit	1st Battalion, 151st Infantry Regiment Indianapolis, Indiana	224th Engineer Battalion Fairfield, Iowa
Army National Guard Small Unit	D Company, 113th Aviation Regiment Reno, Nevada	41st Adjutant General Company Salem, Oregon
Army National Guard Supporting Unit	Joint Forces Headquarters - Florida St Augustine, Florida	Camp Atterbury Edinburgh, Indiana
All-Army Installation	Fort Hood, Texas	Fort Bragg, North Carolina
Operational Deployment Large Unit	426th Brigade Support Battalion 101st Airborne Division (Air Assault) Fort Campbell, Kentucky	NA
Operational Deployment Small Unit	B Company, 1-35 Armor Battalion 1st Armored Division Baumholder, Germany	NA

this elite competition. What's the prize? Two representatives from each winning and runner-up unit—in each category—will receive an all-expenses paid, four-day trip to the Washington, D.C., area to accept the unit's award. The trip includes travel, per diem, lodging, and ground transportation, as well as time for shopping, tours of the area, and a photograph taken with the Army Chief of Staff.

Significant dates for the 2007 competition are as follows:

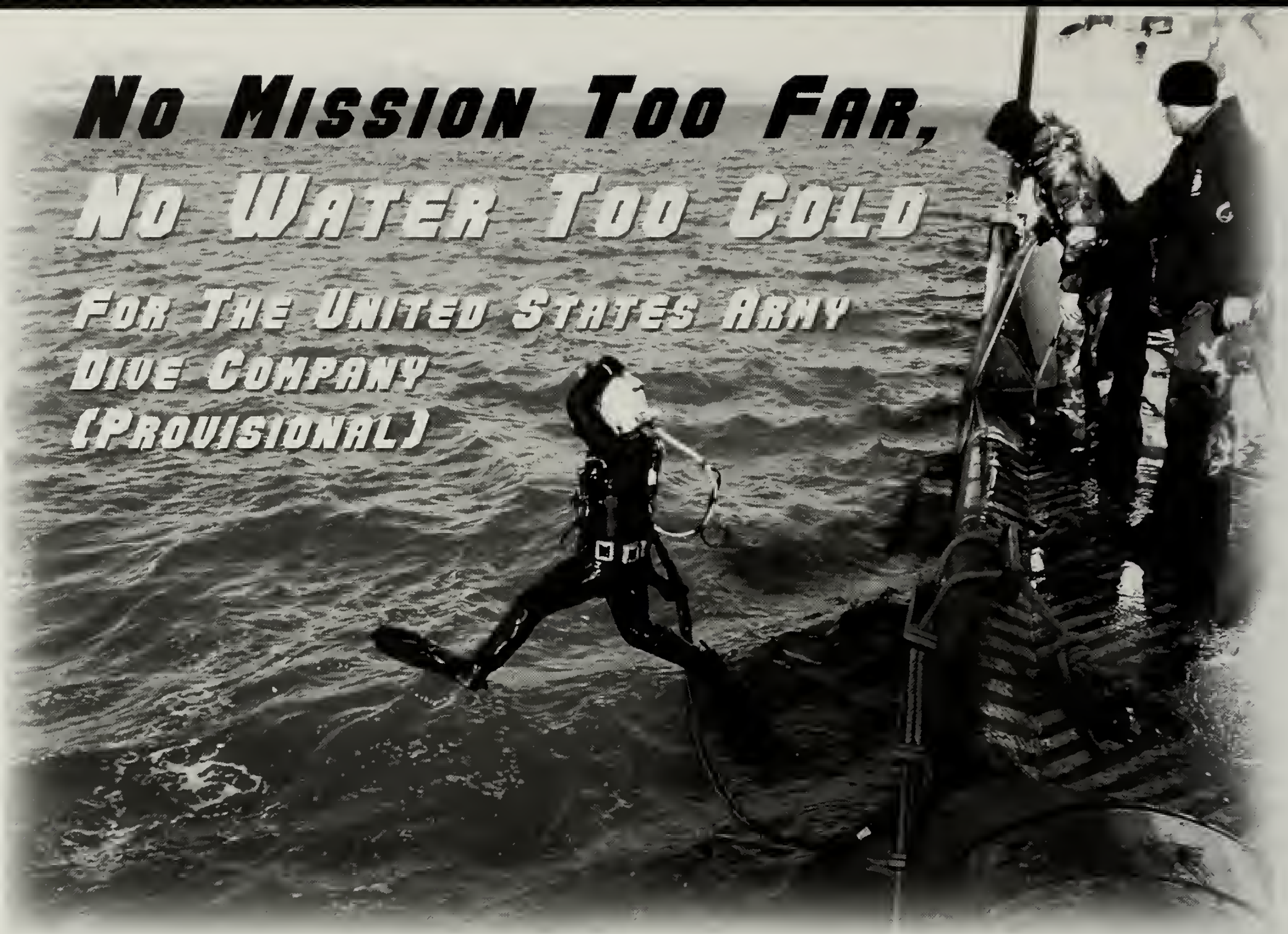
- Competition period: 1 December 2005–30 November 2006. Submit packets through command channels.
- MACOM nomination packets are due to the DEA evaluation board: 31 January 2007.
- DEA board screens MACOM unit packets to select semifinalists: 5-16 February 2007.
- DEA teams visit selected semifinalists and conduct on-site observation of deployment practices: 1-25 March 2007.
- Army G4 selects and announces the winners via a Headquarters, Department of the Army, message: 9 April 2007.
- DEA awards are presented at the Chief of Staff, Army (CSA) Combined Logistics Excellence Award Ceremony/Banquet: 17 May 2007.

The 2006 DEA winners did a number of things to stand out in the competition. First, they selected an appropriate category—the category that best fit the deployment event. Units planning to compete in 2007 should consider the deploying unit categories that historically have the fewest number of units competing and may offer the greatest opportunity. The 2006 winners also fully documented and explained their deployment event. Remember that the board only knows what you tell them, so include a complete description of what your unit accomplished during the deployment phase. Each packet has specific requirements. Make sure you address all of them, and support the verbiage with pictures—they really help. The DEA program guidance and evaluation criteria are available on the DEA Web page at <*http://www.deploy.eustis.army.mil/Default.html*>. For additional information, contact the DEA Program Manager, Mr. Henry Johnson, at commercial (757) 878-1833 or DSN 927-1833.

Mr. Ledebuhr is chief of the Operations and Training Branch of the Deployment Process Modernization Office at Fort Eustis, Virginia. Retired from the Army, his service as a Transportation Corps officer included assignments with the 3d Armored Division, III Corps, Training With Industry, and 1st Armored Division.

No Mission Too Far, No Water Too Cold

For The United States Army Dive Company (Provisional)



By Sergeant Tyler Dodd and First Lieutenant Timothy Mitroka

It was 0345 on 23 February 2006 when two divers from the 86th Engineer Team (Dive) (based out of Fort Eustis, Virginia) departed in a 26-foot moving truck packed with scuba and surface-supplied diving equipment for a cross-country trip to Astoria, Oregon. The two reached their destination after four days of driving and met up with seven other divers from the 86th Engineer Team (Dive) who flew in the day before. The team was on a mission in support of the Mid-Atlantic Regional Maintenance Center to inspect the hull of a United States Coast Guard vessel called the *Fir*, a 225-foot seagoing buoy tender.

The air temperature was cold and the water temperature even colder, topping off around 40 degrees Fahrenheit. For the next five days, the divers had to overcome less than optimal diving conditions to complete the job. Work consisted of removing, cleaning, and replacing metal grates on the vessel's hull (which weighed 70 to 80 pounds); inspecting the entire hull and running gear (which consisted of the propellers, shafts, and stave bearings) for any damage; documenting specific areas of the hull with underwater video and photography; and conducting a paint thickness analysis along the entire hull. The team spent nearly 75 hours working underwater to complete the job. The low visibility underwater increased the difficulty level, but the cold water was the limiting factor of each dive evolution. On average, the most a diver spent in the water at one time was around 90 minutes.

A diver is unhatted after conducting a dive in the cold water surrounding the *Fir* in Astoria, Oregon.

Divers inspect the water around the *Hickory* before jumping in to conduct a hull inspection.

By 4 March, the work was completed on the *Fir*. But a similar Coast Guard vessel, the *Hickory*, was docked 2,700 miles away in Homer, Alaska. The *Hickory* was scheduled to have the same hull inspection. This time, all nine divers spent four days driving north through Washington, Canada, and Alaska. Once they arrived on the jobsite, they were faced with working in 26- to 28-degree-Fahrenheit water with small ice sheets floating nearby.

To combat the effects of the freezing water, one of the divers put his engineering skills to work and devised a system that would pump hot water into their wet suits. Using a garden hose, plumbing fittings, and aquarium tubing, the divers were supplied with a constant flow of hot water—pumped from the vessel's water supply—to surround their entire body while they worked in the cold water. This invaluable system allowed the divers to double, even triple, the average time they had spent underwater while in Astoria. One of the divers spent a total of 410 minutes in the water during one working dive.

When inspecting the *Hickory*, the team supervisors implemented lessons learned from the work they did on the *Fir*. The divers also knew exactly what needed to be done and how to do it more efficiently the second time around. The knowledge gained, combined with the newly implemented work strategies, greatly reduced the total time required to complete the mission. It took the divers only 30 hours of combined diving time to complete the hull inspection on the *Hickory*.

The scenery surrounding the bay was one of a kind, from the snow-covered mountains to the dozens of bald eagles flying around the area. Having the opportunity to dive in Alaska is a once-in-a-lifetime opportunity for most divers, but for one dive supervisor, it was the second trip to Alaska for a dive mission, and he was able to take what he learned from diving in cold water and share it with the rest of the team.

This type of work is fairly routine for Army divers. These missions reinforced the team's ability to work underwater (particularly the ships husbandry aspect), but more importantly, it reinforced the importance of working relationships with other services and agencies—not only the Coast Guard but also the Navy, Marines, Air Force, and any other government agency having a need for divers, both stateside and overseas.

Sergeant Dodd is a team leader/lead diver (salvage diver) with the United States Army Dive Company (Provisional)–86th Engineer Team (Dive). Previous assignments include Delta Company, 577th Engineer Battalion, Panama City Beach, Florida (Second-Class Diver School), and he has 3 1/2 years experience as an Army diver.

First Lieutenant Mitroka is a platoon leader with the United States Army Dive Company (Provisional)–86th Engineer Team (Dive). Previous assignments include Delta Company, 577th Engineer Battalion, Panama City Beach, Florida (Basic Diving Officer Course), and he has 14 months experience as a diving officer. He is a graduate of the United States Military Academy.

Task Force Ripper

Rapid Pothole/Pavement Repair

By First Lieutenant Christopher T. Dening

After years of anti-Iraqi forces activity, the main supply routes (MSRs) and alternate supply routes (ASRs) of Iraq have become riddled with craters. Insurgents have staged and detonated improvised explosive devices (IEDs), which have created various-sized craters in the pavement. These craters are a problem for convoys traveling across theater because they reduce mobility and provide the insurgency with additional places to conceal IEDs.

For this reason, theater engineers initiated the rapid pothole/pavement repair (RPR [pronounced *ripper*]) mission. Soldiers from Bravo Company and Headquarters Support Company, 84th Engineer Battalion (Combat) (Heavy), were tasked with the RPR mission and have worked hard to ensure that MSRs and ASRs in the battalion's area of operations are crater-free. Known as Task Force Ripper, the RPR teams travel the roadways of Iraq, patching damaged routes.

The 84th cannot claim all the credit for the completed work, because various maneuver units provided security to support these engineers. The RPR teams fill and repair the holes while the security units direct traffic and provide protection. The coordination of a RPR team and a security unit requires intense and thorough planning by the leadership of both units. Despite working in a potentially hostile environment with the threat of insurgent activity, the two elements finished the job quickly and safely.

Repairing a Crater

Before an IED crater is deemed repaired, several deficiencies must be corrected. The damaged and cracked asphalt is cut and jackhammered out from the craters edge, creating a new surface to bond with the concrete. If the concrete is just placed on top of old asphalt, the asphalt

Soldiers prepare an IED crater for the placement of concrete.

will expand as the temperature rises and eject the concrete from the patch, rendering the repair useless.

During the wet season, the craters are often full of water, which interferes with the curing of the concrete. Prior to any placement of concrete, all water is pumped out of the crater. After the water is removed, the crater is cleared of debris and backfilled. The backfill is then tamped to compact the soil. The compaction of soil increases its bearing capacity, ensuring that the concrete patch does not sink and form a pothole under the weight of the traffic. Lastly, concrete is placed in the hole and troweled to match the road's surface. This increases the trafficability of the road and reduces wear and damage to vehicles.

Equipment and Methods

The Soldiers of the 84th have a number of tools in their arsenal, or that are easily accessible, to facilitate the RPR process: a 250-cubic-feet-per-minute (CFM) compressed air trailer, a pneumatic concrete saw, a pneumatic jackhammer, a sump pump, a dump truck, a civilian concrete truck, a magnesium trowel, hand trowels, and shovels.

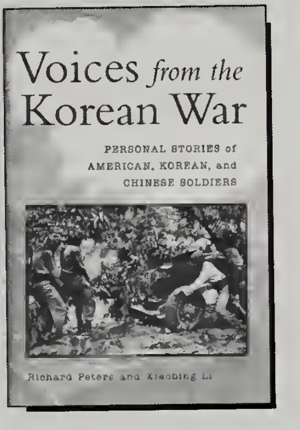
The methods used by the RPR teams have adapted and improved greatly since they first began executing missions. To save on time and resources, the teams now bring their own backfill. Several safety precautions have been implemented to increase Soldiers' safety during operations, to include various methods to mitigate the threat of IED attacks. The teams continue to improve tactics, techniques, and procedures to gain proficiency at filling the many craters that litter the country.

Summary

Task Force Ripper has made it much harder for insurgents to place buried or subgrade IEDs. The RPR teams' goals are to force insurgents to surface-lay IEDs, making them easier for coalition forces to spot and disarm, and to ensure that the crater repair will last.

First Lieutenant Dening is the platoon leader for 1st Platoon, Bravo Company, 84th Engineer Battalion. Previous assignments include working as a project engineer for the Honolulu District, United States Army Corps of Engineers®. He is a graduate of Rutgers College of Engineering with a bachelor's in civil engineering.

Book Reviews


Voices from the Korean War
PERSONAL STORIES of AMERICAN, KOREAN, and CHINESE SOLDIERS
Richard Peters and Xiaobing Li

Voices from the Korean War: Personal Stories of American, Korean, and Chinese Soldiers, by Richard A. Peters and Xiaobing Li, University Press of Kentucky: Lexington, November 2004, 288 pages, ISBN: 0813122937, $35 (hardcover).

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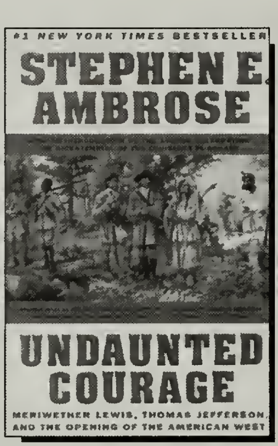
Most books we Americans read on the "Forgotten War" are written from the American perspective. There are a couple from South Korean authors, such as *From Pusan to Panmunjom* by General Paik Sun Yup, but Peters and Li provide an opportunity to see the Korean War from the North Korean and Chinese perspectives.

This book offers firsthand accounts of the suffering of the Chinese forces during their engagements with United States Marines from the "Frozen Chosin" to the harbor city of Hungnam. *Voices* covers the suffering of the civilians and the Soldiers' families, as well as the Soldiers. The book provides insights on the Koje-Do prison riots, reported by both a guard and an organizer within the camps. They believed that the Americans were naïve, which made it easy for the North Korean and Chinese to run the camps, and that many lives on both sides were lost inside the camps due to that naiveté.

Voices from the Korean War also covers a number of campaigns. At times, the stories you are hearing could just as well be from an American, a South Korean, or any of the United Nations service members. This book creates a vivid and multidimensional portrait of the three-year-long conflict told by those who experienced the ground war firsthand.

As Paul Harvey would say, *Voices from the Korean War* tells you "the rest of the story," a story few Americans have heard.



Undaunted Courage: Meriwether Lewis, Thomas Jefferson, and the Opening of the American West, by Stephen E. Ambrose, Simon & Schuster: New York, 1997, 528 pages, ISBN: 0684826976, $30 (hardcover).

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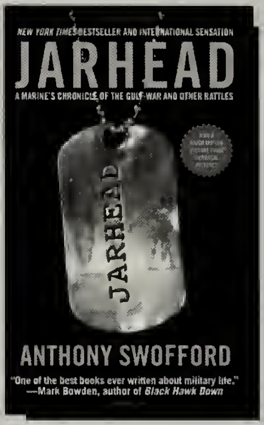
Most Americans think they know the story of Lewis and Clark's expedition with their crew, which they called the "Corps of Discovery." Once you read *Undaunted Courage*, you will really know that story, as well as the story of Meriwether Lewis. The book gets off to a somewhat slow start, because many pages describe the preparations and supplies obtained for the adventure. But imagine packing for a trip where you don't know the route, the length of the trip, or how long it will take to complete. (In comparison, we knew more before we sent a man to the moon.) But once all the preparations are completed, the story begins to move us west, to the start of the expedition in Missouri.

Ambrose makes you feel as if you are a member of the expedition. He introduces you to William Clark and the other members of the Corps of Discovery. You learn of the daily drudgery of the crew as they pull the boats up the Missouri River past many landmarks, many of which are now cities. In addition to having no maps, they had to deal with things such as hostile Indian tribes, constant hunger, wild animals, insect infestation, and bitter weather. This was a true adventure into the unknown. On the expedition, Lewis proves himself to be a first-rate mapmaker and nature writer, with his descriptions of the flora, fauna, and physical beauty of the American Great Plains, Rocky Mountains, and Pacific Northwest.

This was the first real interaction of the United States with the great Native American tribes of the plains and beyond. Again Lewis proves himself to be a first-rate leader and a diplomat with the Native American tribes. Most meetings were peaceful and educational. The Corps of Discovery learned that the different tribes were like different nations and had to be so treated.

Once you have completed this book, you hardly realize you were reading history. It is a very exciting and well-written piece of nonfiction.



Jarhead: A Marine's Chronicle of the Gulf War and Other Battles, by Anthony Swofford, Scribner: New York, March 2003, 260 pages, ISBN: 0743235355, $24 (hardcover).

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This book, from the perspective of a young Marine, is written by a young Marine combat veteran. Swofford takes you through Boot Camp, his first assignment, the build-up for war, life on the battlefield as a sniper, and back to civilian life. *Jarhead* describes the physical and mental stresses associated with the profession—the good times as well as the bad.

As I read *Jarhead*, I had a hard time believing all the crazy, vulgar, and disturbing things that happened. I thought about putting the book down, but couldn't. Then it dawned on me that a large part of this story is how young men deal with the stresses of growing up. Then add the fact that they are going to war and their lingering doubts from that experience. Today, as in the past, it is during the waiting that Soldiers are made.

This book provides a portrait of the brutality and loneliness of today's sophisticated, yet horrendous, battlefield. It reminds Soldiers that they are not the first to experience the doubts, the what-ifs, and the could-have-beens. They learn that it is their buddies who help keep them alive on the battlefield and off, and it is their buddies who help them get back home. *Jarhead* may help Soldiers come to terms with their experiences.

Many military members have a love/hate relationship about their service, and that is how I feel about *Jarhead.*

These three book reviews are provided by Mr. Jeffrey L. Rosemann, an instructional systems specialist with the Officers Education Branch, Department of Training Development, United States Army Engineer School. A retired infantry Soldier, he also served as the 2d Infantry Division historian during the beginning of the 50th Anniversary of the Korean War.

Air Base Dorm Takes Off in Arctic

By Dr. JoAnne Castagna

During the 1940s, Greenland was barely an inhabitable area of the Arctic and was under exploration. Today, the United States has a fully operational air base at Thule that was made possible by the United States Army Corps of Engineers® (USACE), who constructed several of Thule's facilities, often under extreme Arctic conditions (see article in *Engineer*, April-June 2005, page 15).

The United States has maintained a military presence in Greenland for more than half a century. Thule Air Base is located in a coastal valley in northwest Greenland, a province of Denmark, which is located above the Arctic Circle between northeastern Canada and Europe. The air base is home to the United States Air Force, U.S. and Danish contractors, and Greenlandic personnel.

The existing housing is substandard, and lodging for visitors is limited as well. To improve the housing and lodging conditions, USACE designed and is constructing a three-story dormitory, which will withstand the harsh Arctic climate. Construction, which began in March 2005, is being performed by MT Hojgaard, a Danish firm, under the supervision of USACE. The project will be completed sometime in the summer of 2006—one winter season ahead of schedule and within budget.

When completed, the dormitory will have 72 rooms for junior and senior noncommissioned officer visitors. A number of rooms will be divided into four-bedroom modules (with individual bathrooms and walk-in closets) that include a shared social space, a housekeeping area, and a laundry room. In the center of each floor is a common area with a kitchen and appliances. The common areas provide the occupants a place to relax and socialize.

The dormitory project is in the center of the air base, and the bright red and blue exterior stands out against the Arctic snow-covered landscape. The steel superstructure stands on concrete footings and has an insulated metal panel system exterior and a pitched standing metal panel system roof. The interior mechanical, electrical, plumbing, and fire protection systems are all designed to withstand extreme subzero temperatures, and the walls are constructed with a typical metal stud and gypsum board assembly.

Constructing the dorm can be a challenge, considering the severe weather conditions and limited exterior-construction

Photo by Sterrett Daniels, USACE, New York District

A contractor inspects the installation of the dorm's metal decking flooring system.

timeline. Due to the weather, outside construction at Thule is limited to a 3-month time frame—the summer and fall months (June to mid-September)—because the weather during the winter season is too severe to work outdoors, with the extreme temperatures ranging from -30 to -40 degrees Fahrenheit. The exterior must be enclosed within this window of time.

Outside construction is also limited by daylight cycles. Because of Thule's proximity to the North Pole, it has 24 hours of sunlight from May through August and 24 hours of darkness from November through February.

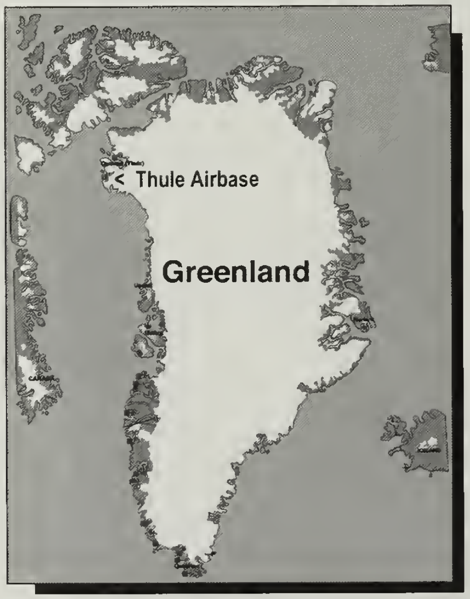
Photo by Sterrett Daniels, USACE, New York District

The dorm is closed in from the severe Arctic weather, 1 October 2005.

Once the building shell is completed, interior work can continue uninterrupted during the winter months. The construction team worked 12-hour days during the summer months and worked inside throughout the long winter months, which contributed to the project being ahead of schedule.

Also, it is during the summer months that building supplies are received. Greenland is locked in by ice 9 months out of the year. During the summer months—with temperatures about 40 degrees Fahrenheit—the island's frozen shipping lanes can be broken up to allow supply ships in.

Because of the limited construction time, most of the building materials are prefabricated before being shipped in, which helps the workers to rapidly perform the construction. Some of the materials that were prefabricated for the dormitory include the concrete foundations, the structural steel, and the insulated metal panel systems for the walls and roof.



Thule Air Base, Greenland, is the northernmost U.S. military installation.

One of the most significant differences in constructing in the Arctic region is with the unique foundation of the buildings. The land is primarily composed of permafrost—permanently frozen ground below the earth's surface ranging from 6 feet in some areas to 1,600 feet in others. Because of this terrain, building foundations need to be elevated. Buildings must sit on concrete supports, allowing air corridors to separate the building from the ground. One meter of air clearance is required between the ground and the bottom of the building. This prevents heat that is generated from the building from melting the permafrost and causing the building to sink.

Engineers who are working on projects with limited construction time due to the elements should consider—

- Minimizing construction delays by resolving contractor requests for information as soon as possible by thoroughly reviewing contract plans and specifications prior to construction.
- Resolving contractor issues promptly by being flexible and available.

For additional information about Thule Air Base, visit its Web site at <*www.thule.af.mil*>. For information on the USACE military construction program, contact the author via e-mail at <*joanne.castagna@usace.army.mil*>.

Dr. JoAnne Castagna is a technical writer with the USACE New York District.

Robert E. Lee and the Importance of Engineer Reconnaissance

By Lieutenant Colonel Kevin Dougherty (Retired)

Emory Thomas writes of the Mexican War that "for the first time in American history, United States armies marched on foreign soil and fought battles in an alien land. Maps were few and often unreliable, and Mexican guides for obvious reasons were even fewer and even less reliable. What... commanders required of the engineers was reconnaissance—accurate information about roads, rivers, terrain, and the enemy. Consequently, engineer officers very quickly made themselves indispensable and found themselves not only recommending routes and evaluating enemy positions but also offering informed advice about strategy and tactics."[1] British Major General Sir Frederick Maurice echoes that "at that time picked officers of the Engineers' Corps, itself a *corps d'elite*, performed many of the functions which today are assigned to the General Staff. They made reconnaissances, undertook the selection of positions, and prepared plans and orders for their general."[2]

One of these noble engineers was Captain Robert E. Lee. Lee's contributions to the American war effort in Mexico were phenomenal. The American commander General Winfield Scott described Lee as "the very best soldier I ever saw in the field" and suggested that in the event of war, the government should insure Lee's life for $5 million a year.[3] But if Lee's contribution to the war was great, the war contributed to Lee as well. Douglas Southall Freeman concluded the following with regard to the Mexican War's impact on Lee: "The relation of careful reconnaissance to sound strategy was impressed on Lee by every one of the battles he saw in Mexico... . Lee had shown special aptitude for this work, and he left Mexico convinced for all time that when battle is imminent, a thorough study of the ground is the first duty of the commanding officer. Reconnaissance became second nature to him."[4] This lesson is still true today.

Cerro Gordo

One of the most famous of Lee's Mexican War reconnaissance exploits was at Cerro Gordo, the name of both a 1,000-foot round hill and the town that lay behind it. Seven miles to the east was another town named Plan del Rio. Both are on the left or north bank of the Rio del Plan, a river that runs east-west in a straight line. The National Road joins the two towns but does not follow the banks of the river. Instead, it meanders off to the northeast immediately after leaving Plan del Rio and only later does it return and run along the river before reaching Cerro Gordo.

Robert E. Lee as a captain in the Corps of Engineers

Along that stretch where there was considerable space between the National Road and the river bluffs, Mexican commander Antonio Lopez de Santa Anna had positioned three artillery batteries on prominent cliffs to command the National Road approach. Santa Anna's main defensive position was on the hill of Cerro Gordo, a couple of miles behind these artillery batteries. Americans approaching Santa Anna along the National Road would be exposed to deadly fires.

The defense however had one weakness. To Santa Anna's left or north flank there was an extensive tract of wilderness, the vegetation being so thick that Santa Anna had no reasonable observation in that direction. His flank was thus vulnerable, but he was willing to accept this risk because he considered the tangled woods impassable. Santa Anna's subordinates did not share this confidence, but in spite of their pleas to defend the flank, Santa Anna sent only an observation post.

General Scott wanted to avoid a costly frontal attack down the National Road. He had the benefit of earlier reconnaissance of the area along the National Road and of the Mexican artillery positions between the road and the river that had been performed by Lieutenants Joe Johnston, P. G. T. Beauregard, and Zealous Tower. What he needed now was information about the potential route around Santa Anna's left flank. Thus he dispatched a second reconnaissance mission led by Major John Smith, chief engineer, and Captain Robert E. Lee.[5]

Lee summarized the problem, writing that "the right of the Mexican line rested on the river at a perpendicular rock, unscalable by man or beast, and their left on impassable ravines; the main road was defended by field works containing thirty-five cannon; in their rear was the mountain of Cerro Gordo, surrounded by entrenchments in which were cannon and crowned by a tower overlooking all—it was around this army that it was intended to lead our troops."[6] Slowly Lee worked his way up the ravines north of the river. The terrain was difficult, but Lee thought it would not be impossible to construct a crude road over it.

At one point Lee stopped at a spring to which a path led from the south. From the evidence of much traffic, Lee concluded that he was at the rear of the Mexican left flank. Before long, he heard Spanish voices and saw a group of Mexican soldiers coming forward toward the spring. With just an instant to react, Lee dropped down behind a large brush-covered log close to the water. More and more Mexicans came and went, some sitting on the very log behind which Lee hid. Lee remained in this precarious position the remainder of the day. Not until darkness came did the last Mexican leave and Lee was able to steal away.[7]

Upon returning to American lines, Lee compared notes with Major Smith who, on his own reconnaissance, had come to similar conclusions as Lee. While both recognized the possibility, they were not completely sure whether the Army could maneuver around the Mexican left. Scott directed them to continue their reconnaissance the next day and detailed to Lee a work party to cut a trail. By the end of that day, Lee and his crew had prepared a passable new trail up the ravine.[8]

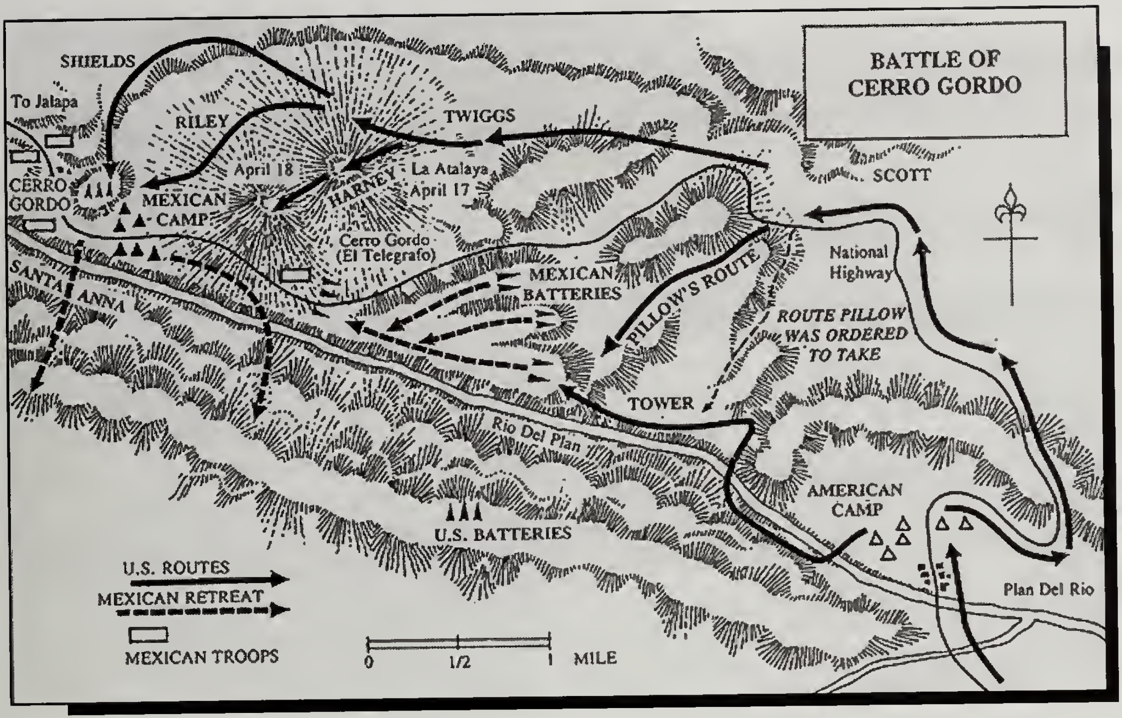
Not only was Lee responsible for finding the route and building the road, but Scott also entrusted him with serving as guide for Brigadier General David Twiggs' division in the conduct of the attack. Freeman refers to this latter mission as "two days of the heaviest responsibility [Lee] had ever known." Lee led Twiggs' men up the ravines that passed around Santa Anna's left, emplaced an artillery battery, and guided a brigade around the northern flank of Cerro Gordo with the intention of cutting off the enemy retreat.[9]

Lee performed all these tasks with distinction. Scott wrote that Lee was "indefatigable during these operations, in reconnaissance as daring as laborious, and of the utmost value." Lee was brevetted to major "for gallant and meritorious conduct in the Battle of Cerro Gordo." Freeman summarizes that "No other officer of the army received such high praise; none gained so much in prestige by the action."[10]

Impact on Lee

Thus, as an engineer, Lee developed the genius for intelligence, reconnaissance, understanding the terrain, and turning the enemy that marked his generalship as commander of the Army of Northern Virginia during the Civil War. Emory Thomas notes that it was in Mexico that Lee learned to "act upon accurate reconnaissance,"[11] and Freeman notes that it was there that Lee "had disclosed a

Battle of Cerro Gordo during the Mexican-American War, painting by Carl Nebel



special aptitude for reconnaissance."[12] These lessons were borne out in the Civil War. It was there that Freeman concludes Lee's "offensive strategy rested upon thorough study of the terrain."[13] Whether in Mexico or in Virginia, Burke Davis observes that "Lee, somehow, always found a route to the vulnerable flank of the enemy."[14] It was a skill he had learned as an engineer.

Applicability Today

Captain Matt Pasvogel documents this applicability in his article in the April 2000 *Engineer* entitled "Route Reconnaissance: A Lost Art." In it, Captain Pasvogel notes that in support of Allied operations in Kosovo, his "company eventually reconnoitered more than 500 kilometers of roads and several tunnels and ferry sites and classified more than 90 bridges in Albania. Because many of today's military missions initially occur in countries with underdeveloped lines of communication, engineers must be well-trained in the vital mission of route recon."[15] He also records that "while performing initial route-reconnaissance missions, we realized they were very different from the heavily rehearsed and trained engineer obstacle-reconnaissance missions."[16]

Captain Lee may have entertained similar musings while hiding behind a log by a spring outside of Cerro Gordo. Pasvogel concludes that the Army's existing doctrine on route reconnaissance is sound, but more training emphasis on this task is required.[17]

As Supreme Allied Commander, Europe, during the operations in Kosovo, General Wesley Clark would agree with Captain Pasvogel's assessment. In studying the various options for ground attacks, General Clark was drawn to avenues of approach through northeast Albania. Such an avenue would bypass the Serb's main defenses,[18] just as Scott had sought to do in Mexico. Clark assessed the situation as "tough terrain, yes; impossible, no."[19] Again, it was the same situation that Scott had faced. Like Scott, Clark relied on further reconnaissance to develop the situation. As planning continued, Clark learned that there were bypasses.[20] He even references "the brilliant work by a British engineer who had planned the full use of the river and lake system to transport heavy equipment into northeast Albania."[21] Bypasses were possible. Clark was confident the mission could be done, writing that "we had looked at roads, calculated repair requirements.... We had made the on-the-ground reconnaissance and double-checked it."[22]

As had been the case in Mexico, few details were known of the terrain in Albania and Kosovo prior to the crisis. These details were provided to a large extent by engineer reconnaissance. It was this reconnaissance that allowed General Scott to turn Santa Anna at Cerro Gordo. It also gave General Clark the confidence to push for a ground attack option in Kosovo. Without a doubt, engineer reconnaissance is an indispensable combat multiplier.

Lieutenant Colonel Dougherty (Retired), who now teaches in the Department of History, University of Southern Mississippi, was formerly a Professor of Military Science there. Other assignments include Commander, 2d Battalion (Training Support) (Infantry), 393d Regiment, Fort Chaffee, Arkansas. He is a graduate of the United States Military Academy and the author of The Peninsula Campaign of 1862: A Military Analysis *(see review on page 52).*

Endnotes

[1] Emory Thomas, *Robert E. Lee*, W. W. Norton, New York, 1997, p. 115.

[2] Frederick Maurice, *Robert E. Lee: The Soldier*, Bonanza Books, New York, 1925, p. 25.

[3] Thomas, p. 140.

[4] Douglas Southall Freeman, *R. E. Lee*, Volume 1, Charles Scribners' Sons, New York, 1934, pp. 296-297.

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[6] Freeman, p. 239.

[7] Ibid., pp. 239-241.

[8] Ibid., p. 241.

[9] Ibid., pp. 242-244.

[10] Ibid., pp. 247-248.

[11] Thomas, p. 140.

[12] Freeman, pp. 246-247.

[13] Stuart Smith, *Douglas Southall Freeman on Leadership*, White Mane Publishing, Shippensburg, 1993, p. 168.

[14] Burke Davis, *Gray Fox*, Rinehart, New York,1956, p. 40.

[15] Matt Pasvogel, "Route Reconnaissance: A Lost Art," *Engineer*, April 2000, p. 14.

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[18] Wesley Clark, *Waging Modern War*, Public Affairs, New York, 2001, pp. 308-309.

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[20] Ibid., p. 302.

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[22] Ibid., p. 311.

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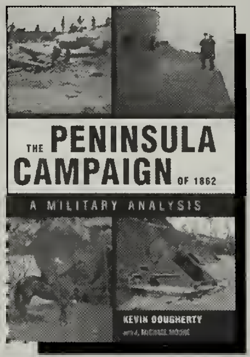
Book Review



The Peninsula Campaign of 1862: A Military Analysis, by Kevin Dougherty with J. Michael Moore. University Press of Mississippi, July 2005, illustrated, index, bibliography, appendixes, 192 pages, ISBN 1-57806-752-9, HIS027060, HIS036050, $45 (hardcover).

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A military history of McClellan's ambitious drive on Richmond and the genius and fortune by which Lee foiled it inspired many history books. No previous work, however, analyzes Union General George B. McClellan's massive assault toward Richmond in the context of current and enduring military doctrine. *The Peninsula Campaign of 1862: A Military Analysis* fills this void. Background history is provided for continuity, but the heart of this book is military analysis and the astonishing extent to which the personality traits of generals often overwhelm even the best efforts of their armies.

The Peninsula Campaign lends itself to such a study. Lessons for those studying the art of war are many. On water, the first ironclads forever changed naval warfare. At the strategic level, McClellan's inability to grasp Lincoln's grand objective becomes evident. At the operational level, Robert E. Lee's difficulty in synchronizing his attacks deepens the mystique of how he achieved so much with so little. At the tactical level, the Confederate use of terrain to trade space for time allows for a classic study in tactics.

Moreover, the campaign is full of lessons about the personal dimension of war. McClellan's overcaution, Lee's audacity, and Jackson's personal exhaustion all provide valuable insights for today's commanders and for Civil War enthusiasts still debating this tremendous struggle. Historic photos and detailed battle maps make this study an invaluable resource for those touring the many battlegrounds from Young's Mill and Yorktown through Fair Oaks to the final throes of the Seven Days' Battles.

Kevin Dougherty, a retired infantry officer, teaches in the Department of History at the University of Southern Mississippi. He has also authored The Coastal War in North and South Carolina. *J. Michael Moore is the registrar of Lee Hall Mansion, Newport News, Virginia.*

ENGINEER UPDATE

Commercial numbers are (573) 563-xxxx and Defense System Network (DSN) numbers are 676-xxxx unless otherwise noted.

Urban Mobility Breaching Course (UMBC). The UMBC is a 3-week course conducted at Camp Lejeune, North Carolina, by the United States Marine Corps, with assistance from three United States Army engineers. Two weeks of the course are consolidated training, and the remaining week is Army-unique. The maximum Army course load for the UMBC is 15 students. Slots for the course can be reserved through the Army Training Requirements and Resources System (ATRRS).

The UMBC provides advanced information on urban breaching operations. The course consists of in-depth explosive theory; detailed planning that combines operational and training safety issues; urban reconnaissance; and employment of urban breaching assets, including explosive, manual, and ballistic breaching techniques for urban operations. The UMBC teaches the use of Current Force equipment that supports mobility operations in support of the maneuver force.

Students must meet requirements listed in Department of the Army Pamphlet 611-21, *Military Occupational Classification and Structure,* and Army Regulation 600-9, *The Army Weight Control Program;* be a combat engineer noncommissioned officer in the grade of E-5 (P) through E-7 and a graduate of the combat engineer Basic Noncommissioned Officer Course (BNCOC); have no pending Uniform Code of Military Justice (UCMJ) actions; and have no limiting profiles.

<table>
<tr><th colspan="3">Fiscal Year 2006 Class Schedule</th></tr>
<tr><th>Class Number</th><th>Report Date</th><th>Graduation Date</th></tr>
<tr><td>CLS 06</td><td>13 Aug 06</td><td>1 Sep 06</td></tr>
<tr><td>CLS 07</td><td>10 Sep 06</td><td>29 Sep 06</td></tr>
<tr><th colspan="3">Fiscal Year 2007 Class Schedule</th></tr>
<tr><th>Class Number</th><th>Report Date</th><th>Graduation Date</th></tr>
<tr><td>CLS 01</td><td>15 Oct 06</td><td>3 Nov 06</td></tr>
<tr><td>CLS 02</td><td>26 Nov 06</td><td>15 Dec 06</td></tr>
<tr><td>CLS 03</td><td>21 Jan 07</td><td>9 Feb 07</td></tr>
<tr><td>CLS 04</td><td>25 Feb 07</td><td>16 Mar 07</td></tr>
<tr><td>CLS 05</td><td>15 Apr 07</td><td>4 May 07</td></tr>
<tr><td>CLS 06</td><td>3 Jun 07</td><td>22 Jun 07</td></tr>
<tr><td>CLS 07</td><td>5 Aug 07</td><td>24 Aug 07</td></tr>
</table>

The point of contact for this course is the Directorate of Training and Leader Development (DOTLD) Sergeant Major at (573) 563-4094 or e-mail *<atsedot@wood.army.mil>. The* DOTLD Web site is *<http://www.wood.army.mil/dotld/>.*

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Center for Engineer Lessons Learned (CELL). The United States Army Engineer School CELL needs your help. To keep training, doctrine, and combat developments current and to prepare for the future, it is critical that the school continuously receive relevant engineer observations, insights, and lessons (OIL). The CELL can derive information from a variety of sources: unit after-action reports (AARs); tactics, techniques, and procedures (TTP) used by units in and returning from theater; Soldier observations/submissions to the Engineer School; and requests for information (RFIs).

This information is used to conduct doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) gap analyses and to determine solutions. These solutions are distributed to the Engineer Regiment via new doctrine and training products, *Engineer* (The Professional Bulletin of Army Engineers) and other publications, and Web sites and by answering RFIs. (The Engineer School RFI Web site provides the Engineer Regiment a reachback capability.)

You can help by forwarding any of these materials from your unit's deployment to the CELL. Unclassified information can be sent to *<Doctrine.Engineer@wood.army.mil>* or *<reggie.snodgrass@us.army.mil>*. Classified information can be sent by secure Internet protocol, routed (SIPR) e-mail to *<snodgrassrg@monroe.army.smil.mil>*. For more information, call (573) 563-4117.

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Visual Archive. The History Office at the Engineer School is developing a visual archive. It currently has more than 18,000 photographs, largely from World War II and Korea. Units that would like to contribute photographs (copies) or other visual material should contact Dr. Larry Roberts, Historian, United States Army Engineer School, Fort Leonard Wood, Missouri 65473. Where possible, caption information should accompany the images. If you have questions, call Dr. Roberts at (573) 563-6109.

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Front Cover: Soldiers of HHC, 130th Engineer Brigade, conduct precombat checks before departing LSA Anaconda, Iraq, in support of a humanitarian mission. (See article on page 41.) Photo by Staff Sergeant James Morris.

Back Cover: Photos courtesy of the United States Army.

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Clear The Way

By Major General Randal R. Castro
Commandant, United States Army Engineer School

Hello everyone and greetings once again from Fort Leonard Wood. Judy and I are thankful for the fantastic time we had with the Soldiers, families, and communities here at the home of the Engineer Regiment. We often talk about Soldiers needing to be agile and adaptive, and soon we will get a chance to see a great agile and adaptive leader in action. Major General William (Bill) McCoy and his wife Jill will be returning to Fort Leonard Wood to take command and lead our Regiment into the future once he completes his mission as Commander of the Gulf Region Division in Iraq.

I would like to thank Brigadier General Todd Semonite and his wife Connie for their inspirational leadership as the Assistant Commandant of the United States Army Engineer School (USAES) for the past year and Command Sergeant Major Clinton (Clint) Pearson and his wife Mollie for tremendous support to our Regiment as well. In July, we welcomed Brigadier General Jack Sterling and his wife Cathy as our new Assistant Commandant. Jack is one of our premier Warfighters who will support our Nation at war and shape our Regiment for the future.

I am extremely proud and honored to have served our Regiment and our Soldiers as your Commandant. I am very impressed with the accomplishments of our sappers, civilians, families, and communities during the past two years as we supported the Global War on Terrorism. I thank each one of you and your families for your sacrifices. The past two years have brought huge positive impacts on our Regiment in support of our Army's missions. Our "Engineer Team" has blended the powerful capabilities of all three components of our Regiment to provide a very responsive capability and function for our Nation. We are all connected in our Team of Teams.

Just to highlight a few of the key successes over the past two years: We have modified every engineer organization that supports the Army to ensure that we can properly support expeditionary warfighting. We have developed improved capabilities inside the Brigade Combat Team (BCT) and are in the process of standing up and converting new Combat Effects Battalions and Construction Effects Battalions to meet the assured mobility function of our ground maneuver commanders.

Clearly, our Counter Explosive Hazards Center (CEHC) remains our Regiment's and Army's "Center of Excellence" for countering explosive hazards. The CEHC has trained both Army and Marine units in improvised explosive device (IED)-defeat awareness and route reconnaissance and clearance and continues to integrate the latest lessons learned from the United States Army Central Command AOR and combat training centers into our unit and institutional training courses.

There have been significant improvements in developing and acquiring new combat vehicles designed to defeat IEDs on the battlefield. Examples of these key pieces of equipment are the Buffalo, the RG-31, the Assault Breaching Vehicle (ABV), the Joint Assault Bridge (JAB), and robot vehicles, all designed to prevent injuries and save lives. And the Program Objective Memorandum (POM) to modernize our equipment has increased more than $5 billion.

We have redesigned both the Officer Basic and Advanced Courses, as well as the Noncommissioned Officer Advanced Course to better develop the "pentathletes" required by our Army now and in the future. Our courses now include key tasks of IED-defeat battle staff planning and considerations for units preparing for combat.

I'm extremely proud of the significant accomplishments from our units in the field in Iraq, Afghanistan, and locations around the world; our Regiment is making a very positive difference, from the Gulf Region Division and Afghanistan Engineer District to the combat units—Active Army, United States Army Reserve, and Army National Guard—to our civilians serving in harm's way to defeat terrorism and help rebuild peaceful nations.

In closing, I say again how thankful I am to have had the opportunity to serve the Regiment alongside such great Soldiers, leaders, and community families as our Regiment trains, deploys, transforms, and restations to meet the needs or our Nation at war. Judy and I wish you all the best. Let's continue to improve our Regimental Team of Teams!

Essayons...and Carry On!

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

Welcome to another great issue of *Engineer*. This quarter has been absolutely *amazing* as we engaged in events ranging from changing major leaders to standing up new units. I offer my sincerest gratitude and a fond farewell to Brigadier General Todd Semonite and his wife Connie, Major General Randal Castro and his wife Judy, and Command Sergeant Major Bill McDaniel and his wife Samm, for they will be truly missed. While these farewells are tough, they become a little easier knowing great people aren't that far behind. Among those to whom I wish a warm welcome are the new Assistant Commandant Brigadier General Jack Sterling and his wife Cathy; the new MANSCEN Command Sergeant Major Michael Hayes and his family; and Major General William McCoy, who will return to Fort Leonard Wood in October as the MANSCEN Commander and Engineer School Commandant, and his wife Jill.

We continue to work the three Ts (Transform the Regiment, Train Soldiers and Leaders, and Take Care of the Regiment) here at the Engineer School. As we transform the Regiment and the Army, we are consolidating MOSs and training them for success. This will help us fight the fight and win the Global War on Terrorism (GWOT). The Fusion Cell continues to gather and present data on the current state of engineer transformation, restationing, and support for the GWOT as they assist in issue identification, communication facilitation, and issue resolution. Synchronization among global repositioning and the BRAC initiatives; deployment in support of GWOT; and transformation to the modular Regiment is the key to success to the Regiment.

To date, the Regiment has activated two engineer battalions from scratch; one brigade, two battalions, one geospatial planning cell, and three equipment support companies have converted to the new modular engineer design. Within the next year, four engineer battalions will be activated and one brigade, two battalions, and a geospatial planning cell will convert.

The Regiment continues to ensure that our noncommissioned officers (NCOs) are getting the best institutional training in the Basic Noncommissioned Officer Course (BNCOC) and the Advanced Noncommissioned Officer Course (ANCOC). These courses will provide the technical training to support and win the GWOT and provide the right training for the Future Engineer Force. Our vision statement boldly guides the Noncommissioned Officer Education System (NCOES) transformation process: *An Engineer Noncommissioned Officer Education System grounded in heritage, values, and tradition; embodies the Warrior Ethos and values; and perpetuates learning to develop NCOs empowered to lead, train, motivate, and retain Soldiers.*

We have recently developed a new course map for the 21B/21C BNCOC and ANCOC based on the critical task selection panel that convened this fiscal year. Many participants were an integral part of the process, to include representatives from the Army National Guard and United States Army Reserve. We have conducted course reviews for our 21H, 21N, 21T, and 62B MOSs in preparation for critical task selection boards and course redesigns.

Positive enhancements continue here at the Engineer School. The migration of updated doctrine and functional courses from the Counter Explosive Hazards Center is an ongoing process. Our BNCOC is leading the way among regiments, introducing search training and forward operating base training during situational training exercises and migrating skill level 3 tasks from the Urban Mobility Breaching Course. In ANCOC, graduates are now certified as train the trainers on the Improvised Explosive Device Defeat – Train the Trainer (IEDD-T3) Course; training on infrastructure requirements—sewer, water, electricity, academics, and trash (SWEAT)—is being conducted; and linking with the EOD fusion cell is extremely valuable. Our NCOES continues to be on the leading edge of digital training. Soldiers attending BNCOC receive 40 hours of FBCB2 training, and ANCOC students receive a 40-hour certification on MCS 6.4 along with 16 hours of MCS-Engineer training. The future of the Engineer Regiment looks brighter than ever as the Army looks to define and implement the pentathlete concept; our outstanding engineer NCOs have always lived and trained that concept before it was even defined.

In closing, I am *very* pleased with the way engineers continue to maintain high standards and lead the way during this GWOT. I am so very proud to be serving in this Regiment. I ask each of you to remember the Soldiers who are away from their homes and families. May God bless our fallen comrades and keep watch over our sons and daughters as we continue to fight the fight. Essayons!

130TH ENGINEER BRIGADE: A YEAR IN IRAQ

By Colonel Thomas W. Kula

Simply put, it's about attitude. The 130th Engineer Brigade and other Operation Iraqi Freedom (OIF) 05-07 engineers went into the country determined to continue the success of previous engineer units and to make a difference. The following articles (pages 4-43) highlight this determination and accomplishments in numerous areas of engineer support to the Multinational Corps–Iraq (MNC–I). It was a team effort all year long. I would like to thank all the OIF 05-07 engineer brigade commanders for their unwavering support and commitment to the fight, the MNC–I command and staff for their guidance and support, and especially the OIF 04-06 team. You set us up for success.

Our Challenge

In October 2005, the 130th conducted relief in place (RIP)/transfer of authority (TOA) of the corps engineer brigade for the MNC–I with the 20th Engineer Brigade. The OIF 05-07 rotation was a turning point for engineers: Their force structure was reduced by 25 percent because the two engineer brigades serving under the 20th, the 30th, and the 194th Engineer Brigades were not replaced. By early December 2005, the 130th was the only engineer brigade above division level in the MNC–I. The unit looked at this period "right out of the starting blocks" as one of its defining moments as the corps brigade. The 130th commanded all corps engineer units spread across the entire theater, including the United States Air Force facility and utility detachments. Truly a joint engineer force, the brigade's strength averaged about 3,300 Soldiers, Sailors, and Airmen—either assigned, attached, or under tactical control (TACON) or administrative control (ADCON)—during its year in-theater.

Building the Team

The 130th team was not only joint but also a mix of active and reserve—one determined "total" Army engineer force. The 130th was augmented with the 412th Engineer Command Construction Management Section (CMS) upon arrival in Kuwait to fill the missing part of the modified table of organization and equipment (MTOE). The 412th's tasks were numerous, not only filling the traditional role of a CMS but also serving as the command and control element for the many facility engineer teams and detachments attached or TACON to the brigade. The 412th CMS was ready and trained, and its accomplishments as part of the OIF 05-07 engineer team are a story in itself. As we built the team, the 46th, 54th, 84th, and 110th Engineer Battalions were also significant in helping piece the engineer team puzzle together with each of their missions.

The 130th built its team and staff well before deployment, ready to link the separate pieces together once in-theater. Beginning with the first of seven corps training exercises, started in September 2004, the command and staff prepared a list of the keys to successful staff operations (Figure 1). Preparation began a year out from deployment, while the brigade simultaneously deployed two of its assigned units from Germany—the 94th Engineer Battalion (Combat) (Heavy) and the 502d Engineer Company—to OIF 3. The 130th staff had its "head in the fight" by deploying and training its units, focused on the complex operating environment in Iraq. We participated in seven command post exercises (CPXs) at the corps and brigade levels to prepare for our mission.

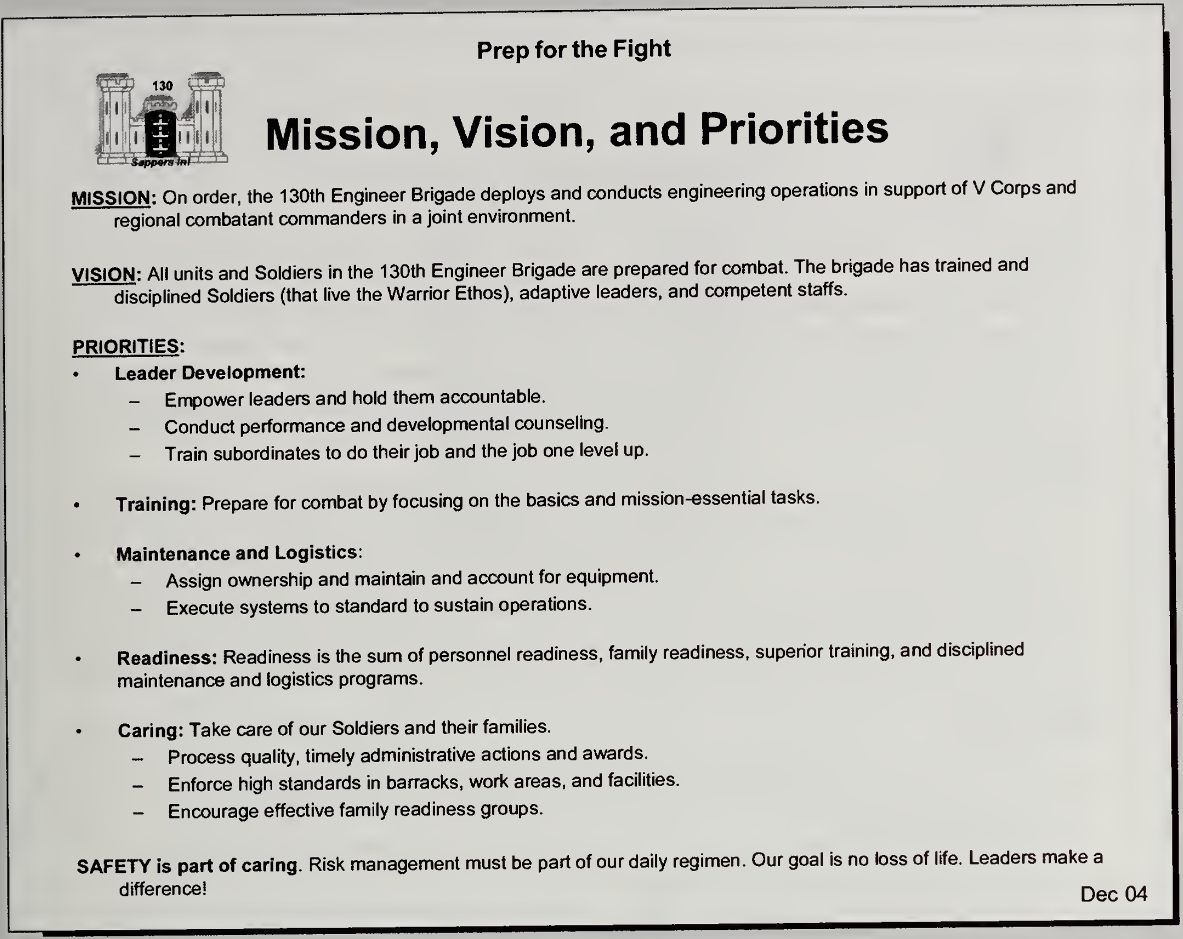
Before the V Corps mission rehearsal exercise (MRX), brigade leaders conducted three leader's recons in-theater so that we fully understood and exercised our mission during this critical MRX. By the time the 130th arrived in Kuwait for reception, staging, onward movement, and integration (RSOI), all that remained was polishing individual and collective battle tasks before heading north into Iraq to assume its mission.

A second product developed during these exercises was a wallet-size leader card to disseminate the command philosophy (Figures 2 and 3). These basics and fundamentals built the

Basics of Brigade Operations

- Execute the fundamentals
  - By staff (expert in your lane)
  - By information (what to do with it)
  - By key roles and missions of the top 5
    - Brigade commander (BC)
    - Command sergeant major (CSM)
    - Deputy brigade commander (DBC)
    - Chief of staff (CoS)
    - S-3
- Keep everyone engaged
  - Clearly identified duties
  - Clearly identified responsibilities
- Maximize use of technology: How can we do it quicker and more efficiently?
- Promote teamwork among staff sections, higher and lower
- Plan ahead: Resource subordinate units for success

Figure 1



Prep for the Fight

Mission, Vision, and Priorities

MISSION: On order, the 130th Engineer Brigade deploys and conducts engineering operations in support of V Corps and regional combatant commanders in a joint environment.

VISION: All units and Soldiers in the 130th Engineer Brigade are prepared for combat. The brigade has trained and disciplined Soldiers (that live the Warrior Ethos), adaptive leaders, and competent staffs.

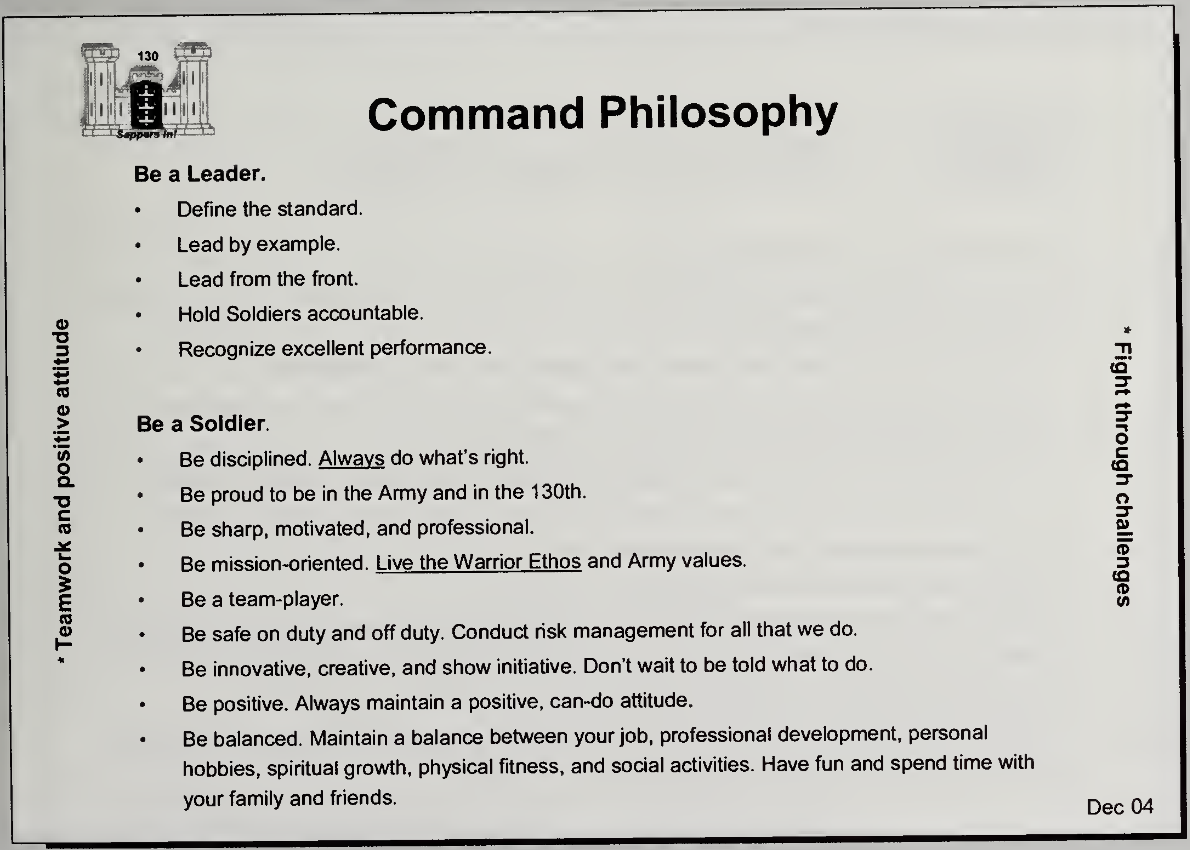
PRIORITIES:

- **Leader Development:**
  - Empower leaders and hold them accountable.
  - Conduct performance and developmental counseling.
  - Train subordinates to do their job and the job one level up.
- **Training:** Prepare for combat by focusing on the basics and mission-essential tasks.
- **Maintenance and Logistics**:
  - Assign ownership and maintain and account for equipment.
  - Execute systems to standard to sustain operations.
- **Readiness:** Readiness is the sum of personnel readiness, family readiness, superior training, and disciplined maintenance and logistics programs.
- **Caring:** Take care of our Soldiers and their families.
  - Process quality, timely administrative actions and awards.
  - Enforce high standards in barracks, work areas, and facilities.
  - Encourage effective family readiness groups.

SAFETY is part of caring. Risk management must be part of our daily regimen. Our goal is no loss of life. Leaders make a difference!

Dec 04

Figure 2



Command Philosophy

Be a Leader.

- Define the standard.
- Lead by example.
- Lead from the front.
- Hold Soldiers accountable.
- Recognize excellent performance.

Be a Soldier.

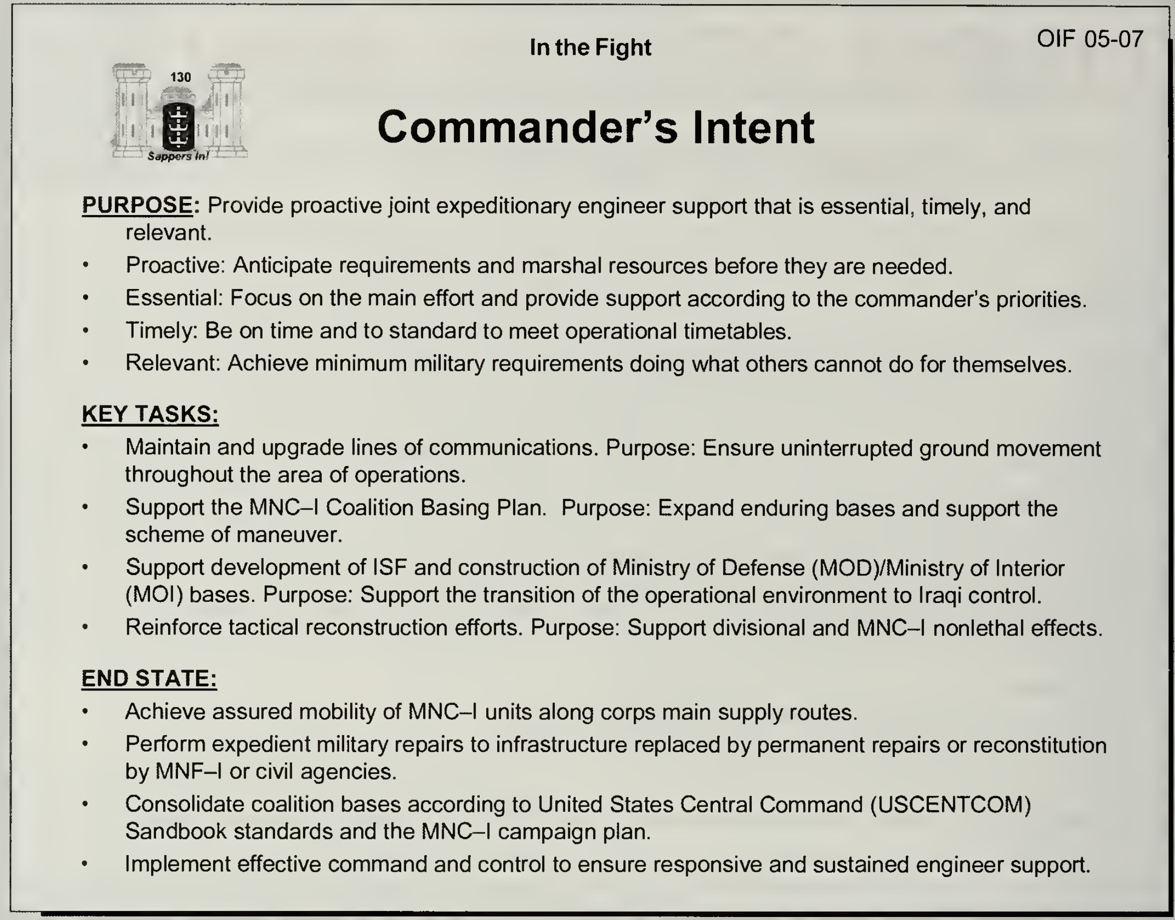
- Be disciplined. Always do what's right.
- Be proud to be in the Army and in the 130th.
- Be sharp, motivated, and professional.
- Be mission-oriented. Live the Warrior Ethos and Army values.
- Be a team-player.
- Be safe on duty and off duty. Conduct risk management for all that we do.
- Be innovative, creative, and show initiative. Don't wait to be told what to do.
- Be positive. Always maintain a positive, can-do attitude.
- Be balanced. Maintain a balance between your job, professional development, personal hobbies, spiritual growth, physical fitness, and social activities. Have fun and spend time with your family and friends.

*** Teamwork and positive attitude**

*** Fight through challenges**

Dec 04

Figure 3



In the Fight

OIF 05-07

Commander's Intent

PURPOSE: Provide proactive joint expeditionary engineer support that is essential, timely, and relevant.

- Proactive: Anticipate requirements and marshal resources before they are needed.
- Essential: Focus on the main effort and provide support according to the commander's priorities.
- Timely: Be on time and to standard to meet operational timetables.
- Relevant: Achieve minimum military requirements doing what others cannot do for themselves.

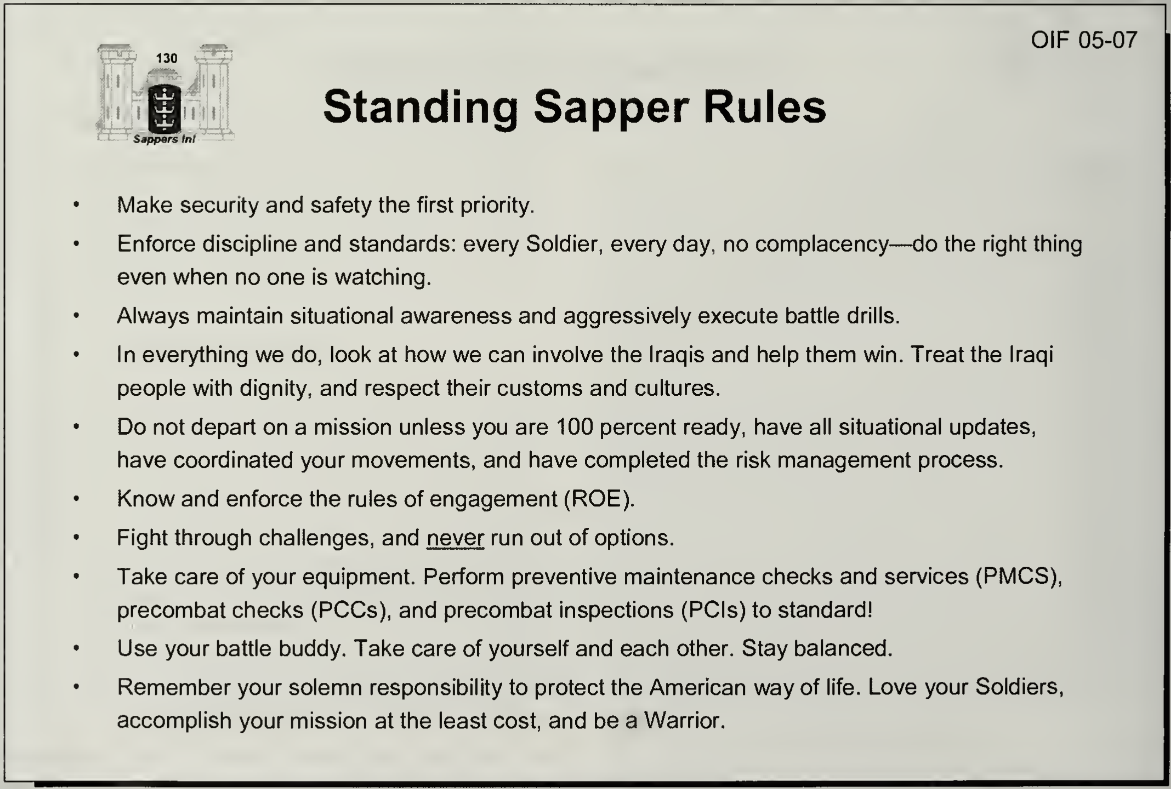
KEY TASKS:

- Maintain and upgrade lines of communications. Purpose: Ensure uninterrupted ground movement throughout the area of operations.
- Support the MNC–I Coalition Basing Plan. Purpose: Expand enduring bases and support the scheme of maneuver.
- Support development of ISF and construction of Ministry of Defense (MOD)/Ministry of Interior (MOI) bases. Purpose: Support the transition of the operational environment to Iraqi control.
- Reinforce tactical reconstruction efforts. Purpose: Support divisional and MNC–I nonlethal effects.

END STATE:

- Achieve assured mobility of MNC–I units along corps main supply routes.
- Perform expedient military repairs to infrastructure replaced by permanent repairs or reconstitution by MNF–I or civil agencies.
- Consolidate coalition bases according to United States Central Command (USCENTCOM) Sandbook standards and the MNC–I campaign plan.
- Implement effective command and control to ensure responsive and sustained engineer support.

Figure 4



OIF 05-07

Standing Sapper Rules

- Make security and safety the first priority.
- Enforce discipline and standards: every Soldier, every day, no complacency—do the right thing even when no one is watching.
- Always maintain situational awareness and aggressively execute battle drills.
- In everything we do, look at how we can involve the Iraqis and help them win. Treat the Iraqi people with dignity, and respect their customs and cultures.
- Do not depart on a mission unless you are 100 percent ready, have all situational updates, have coordinated your movements, and have completed the risk management process.
- Know and enforce the rules of engagement (ROE).
- Fight through challenges, and never run out of options.
- Take care of your equipment. Perform preventive maintenance checks and services (PMCS), precombat checks (PCCs), and precombat inspections (PCIs) to standard!
- Use your battle buddy. Take care of yourself and each other. Stay balanced.
- Remember your solemn responsibility to protect the American way of life. Love your Soldiers, accomplish your mission at the least cost, and be a Warrior.

Figure 5

foundation for preparing the staff to assume corps engineer brigade command and control. These principles for staff, leaders, and Soldiers are just as important today as they were at the start of the deployment. They were also useful tools to pass along to our successor.

As the 130th coordinated with the team prior to deployment, we shared our philosophy for combat operations with our subordinate units. Figures 4 and 5 show OIF 05-07 cards sent out to units before deployment. The130th leadership used the same cards to brief battalion and company leaders as they flowed through RSOI in Kuwait. There are never enough opportunities to team-build for OIF, and these products were useful.

The 130th continued to emphasize *security*, *safety/risk management*, and *discipline* throughout deployment. We considered these as three legs of a stool, with *leadership* banding together and reinforcing the legs. On the stool rests *mission accomplishment* and *keeping troops alive*. It's a platform for success, with each part vital.

Missions and Achievements

With the mission as the MNC–I corps engineer brigade, the 130th's primary focuses were assured mobility (route clearance and bridging) and theater construction. As a carryover from the 20th Engineer Brigade, the 130th continued to provide proactive, essential, timely, and relevant engineer support to the MNC–I. A few of the many missions and achievements of the 130th Engineer Brigade units in OIF 05-07 were—

- *Route clearance* – achieved and consistently sustained greater than 50 percent of the improvised explosive devices (IEDs) found on corps routes.
- *Route sanitation* – cleared 700 kilometers of debris and trash along main routes.
- *IED blasthole and pothole repair* – filled more than 600 potholes.
- *Construction and facilities design and management* – completed 345 projects across theater.
- *Bridging* – emplaced three assault float bridges (AFBs) and one medium Mabey-Johnson bridge (MJB) (Float), conducted two long-term rafting operations, and maintained eight bridges.
- *Topographic/geospatial engineering* – completed 1,800 surveying and mapping projects for units in-theater.
- *Well drilling* – provided wells in Multinational Force–West (MNF–W) at forward operating bases (FOBs) and Iraqi security force (ISF) camps to reduce logistics haul requirements.
- *Electrical power repair, generation, and distribution* – provided constant power to 25 contingency operating bases (COBs) and FOBs and reduced safety hazards.
- *COB and FOB infrastructure repair and expansion* – improved power, water, and sewer systems to Amber or Green ratings.
- *ISF development* – constructed ISF contingency outposts and checkpoints and partnered with the Iraqi Engineer School.
- *Support reconstruction efforts* – supported force protection projects of Iraqi infrastructure.

Joint Team Effort

The success of the brigade was a joint team effort across all the Armed services. From the Air Force detachments working construction all over Iraq, to the Navy electronic warfare officers on brigade and battalion staffs, to embedded Navy explosive ordnance disposal (EOD) personnel, to the mix of Active Army, United States Army Reserve, and Army National Guard service members, the 130th Engineer Brigade was a multifaceted force that made a difference in-theater. Each member of the team played an important role and, by the end, helped the 130th leave its mark during OIF 05-07.

Conclusion

The 130th Engineer Brigade units completed OIF 05-07 with pride and a true sense that they had made a difference. It was a long year; we fought through challenges, and some of our Soldiers were wounded and killed while trying to make a difference. We will never forget our fallen comrades.

Even though the war continues, we measure our success by the victories of our units. We gave it our all, and our sense of accomplishment is best summed up by Coach Vince Lombardi:

> *"I firmly believe that any man's finest hour, the greatest fulfillment of all that he holds dear, is the moment when he has worked his heart out in a good cause and lies exhausted on the field of battle—victorious."*

OIF 05-07 corps engineer units—Soldiers, Sailors, and Airmen—you made a difference. Thank you for serving your country!

Colonel Kula is the commander of the 130th Engineer Brigade. Previous assignments include Joint Readiness Training Center senior engineer observer-controller; Chief, Plans, 82d Airborne Division; Commander, 307th Engineer Battalion, 82d Airborne Division; and plans/operations officer at the United States Southern Command. He is a graduate of the United States Military Academy and the United States Army War College Fellowship Program at the University of Texas.

Honoring Our Fallen Comrades

The accomplishments of Operation Iraqi Freedom 05-07, in support of the Multinational Corps–Iraq, that are described in the articles on pages 4 to 43, were not achieved without loss. Our stories are dedicated to the memory of the Soldiers who gave their lives to help us make a difference.

Corporal Andy D. Anderson	46th Engineer Battalion	Fort Rucker, Alabama
Sergeant Carlos Eugene Pernell	46th Engineer Battalion	Fort Rucker, Alabama
Sergeant Michael David Rowe	46th Engineer Battalion	Fort Polk, Louisiana
Staff Sergeant Omar D. Flores	54th Engineer Battalion	Bamberg, Germany
Sergeant Alkaila Tonee Floyd	54th Engineer Battalion	Bamberg, Germany
Specialist Felipe Jose Garcia Villareal	54th Engineer Battalion	Bamberg, Germany
Specialist Troy Carlin Linden	54th Engineer Battalion	Bamberg, Germany
Specialist Joseph Paul Micks	54th Engineer Battalion	Bamberg, Germany
Private First Class Joseph I. Love	84th Engineer Battalion	Schofield Barracks, Hawaii
Staff Sergeant Lewis J. Gentry	94th Engineer Battalion	Vilseck, Germany
Private First Class Alva L. Gaylord	110th Engineer Battalion	Lexington, Missouri
Specialist Michael Layne Hermanson	164th Engineer Battalion	Minot, North Dakota
Sergeant Leroy Segura, Jr.	362d Engineer Company (MRB)	Fort Benning, Georgia
Sergeant Dustin Daniel Laird	913th Engineer Company (CSE)	Union City, Tennessee
Sergeant Luis Ricardo Reyes	947th Engineer Company (CSE)	Colorado Springs, Colorado

COMMAND RELATIONSHIPS IN A COMBINED FORCE

By Major Matthew V. Burton

As the world is well aware, fighting the war in Iraq is a joint fight: U. S. military forces come together to conduct joint operations. Communication between the administrative control (ADCON) and operational control (OPCON) units is critical. Engineer leaders must doctrinally understand their ADCON and OPCON role because operations in a joint environment will only increase in the future.

Responsibilities

When it comes to understanding command and control relationships, such as ADCON and OPCON, it is critical for battalion- and brigade-level leaders and staff planners to know their roles and responsibilities. Leaders and staff officers must understand the boundaries and limitations to avoid interference with maneuver or combat missions or administrative roles and responsibilities. Likewise, subordinate units must know what to expect and where to go for administrative and logistical support. Not understanding the command relationship or having unclear lanes of responsibility and an ambiguous relationship can be detrimental to an effective and smooth combat operation.

In a joint or multinational force environment, the number of combat commanders with OPCON of engineer forces assigned to the engineer brigade is increasing on the battlefield. ADCON encompasses administrative (legal, personnel, and finance) and logistical support to the maneuver forces. When designated as an ADCON unit, the engineer brigade enters into agreements for certain responsibilities.

Authority

ADCON is the control vested (primarily) in the engineer brigade chain of command and the exercise of authority over subordinate engineer units in respect to administration and support. It includes the organization of engineer forces, control of resources and equipment, personnel management and administration, unit logistics, training, readiness, deployment, redeployment, discipline, and other matters not included in the operational missions of the subordinate or other organizations.

To accomplish missions, commanders are often provided different levels of authority. The amount of authority depends not only on their current position in the chain of command but also on the type of mission. Additionally, when forces are assigned or attached resulting from a relief in place (RIP)/transfer of authority (TOA), the gaining commander assumes a different authority. It is also important for planners to understand the chain of command, the authorities and responsibilities that exist within the chain of command, the various relationships among the ADCON and OPCON commanders during the military decision-making process, and how vital it is to successfully plan any mission with an ADCON or OPCON command relationship.

Chain of Command

The chain of command is the succession of commanding officers, from a superior to a subordinate, through which command is exercised. It is a single chain of command with *two* distinct command relationships. One branch—administrative—extends from the ADCON commander (engineer brigade) to the engineer battalion commander; the other branch—operational (where missions are carried out)—extends from the OPCON commander to the engineer battalion commander.

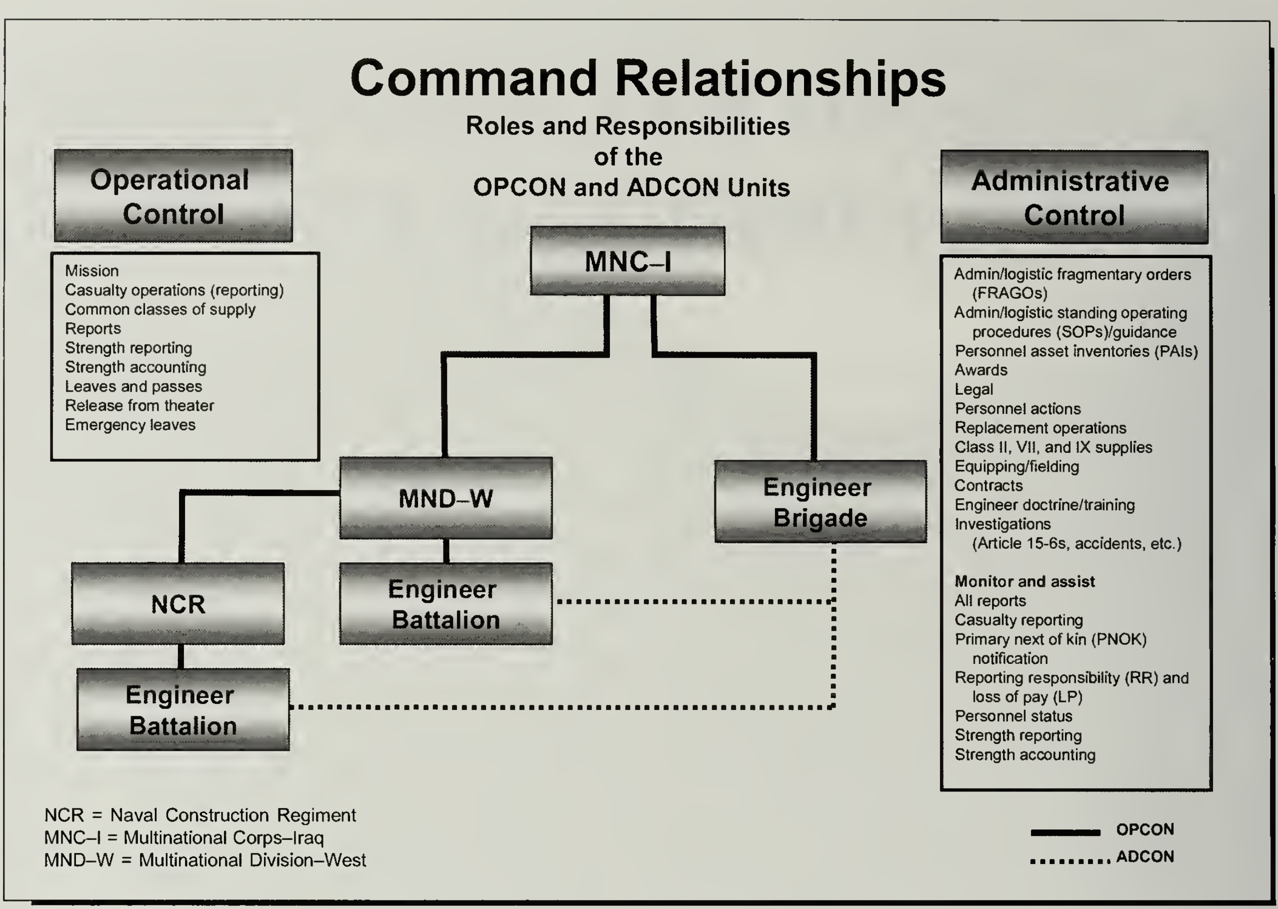
OPCON

Inherent in command authority, OPCON is the authority to perform the functions of command over subordinate forces that involve organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training.

The employment of engineer forces to attain an operational objective through the organization, integration, and conduct of major operations requires services to work with one another. This requires the joint force commander to task-organize Army engineers to work with the Marines for tactical operations, integrating key forces at the level necessary to accomplish assigned missions. Anything that would affect the OPCON, maneuver, or unit combat operational readiness would go through the OPCON unit.

Considerations for the OPCON unit (maneuver) are as follows:

- Tracking emergency leave.
- Tracking rest and recuperation leave and passes.
- Submitting strength reports.


Command Relationships

Roles and Responsibilities of the OPCON and ADCON Units

NCR = Naval Construction Regiment
MNC–I = Multinational Corps–Iraq
MND–W = Multinational Division–West

- Maintaining strength accountability.
- Reporting casualties (using the Defense Casualty Information Processing System [DCIPS]).

ADCON

Administration and support includes organization, control of resources and equipment, personnel management, unit logistics, individual and unit training, readiness, discipline, and other matters not included in operational missions of subordinate or other organizations. ADCON gives authority over subordinate or other organizations on administration and support.

Considerations for the ADCON unit (engineer brigade) are as follows:

- Making recommendations to the OPCON commander on the proper employment of engineer forces.
- Conducting specific engineer-oriented training.
- Informing the OPCON chain of command of changes in logistics and administrative support and logistics functions normal to the command.
- Providing supporting operation and exercise plans with necessary engineer data to support missions assigned by the OPCON commander.
- Enforcing internal administration and discipline: evaluations, Uniform Code of Military Justice (UCMJ) actions, safety reporting, logistical reporting, and casualty operations (casualty notification and assistance).

One way of avoiding conflict or crossing the ADCON or OPCON lane is to have or develop something similar to a memorandum of understanding and agreement that spells out everything from safety and accident investigations, to evaluations, to Class II and Class IX supplies.

Conclusion

Establishing the roles and responsibilities of the ADCON and OPCON units creates a better combat working environment between the units and gives subordinate units a better understanding of when, where, and how to report, as well as what actions to take to be successful on the battlefield. For more information on command relationships, see Joint Publication (JP) 0-2, *Unified Action Armed Forces*.

Major Burton is the S-1 for the 130th Engineer Brigade, Multinational Corps–Iraq. Previous assignments include combat engineer platoon leader and company executive officer, 588th Engineer Battalion; company commander, Alpha Company, 5th Engineer Battalion; engineer observer-controller, National Training Center; and budget officer, Headquarters, United States Military Entrance Processing Command (USMEPCOM).

Photo by Captain Scott Updike

Joint Engineer Culture Clash

Lessons Learned From a Marine Expeditionary Force

By Major R. Daren Payne and Lieutenant Colonel Carol L. Anderson

The 46th Engineer Battalion (Combat) (under the administrative control of the 130th Engineer Brigade) recently served in one of the most unique command structures and diverse task organizations an engineer unit has encountered—joint and multicomponent—representing almost every facet of our nation's military. During this time, the Soldiers and leaders of the 46th learned many hard, valuable lessons and had many "outside the box" construction and combat engineering experiences. Such diverse units and organizational structures, with joint and multicomponent characteristics, are likely to be the rule rather than the exception in the future. This article shares some of the lessons learned and experiences from the unit's year in-theater.

In October 2005, the 46th deployed to Multinational Force–West (MNF–W) in support of Operation Iraqi Freedom. The MNF–W area of operations was under the command of a Marine expeditionary force (MEF), rather than an Army division or corps headquarters, so all Army units fell under a Marine Corps general officer. Since the 46th is combat heavy, the MEF further assigned the unit to the 30th Naval Construction Regiment (NCR)—an Active Navy headquarters commanded and staffed by United States Navy Reserve and a few Active Navy officers. The regiment changed several times during its deployment and sometimes included naval mobile construction battalions (NMCBs) (commonly known as *Seabees*), Marine Corps engineer support battalions, and Army combat engineer battalions.

Soldiers, Sailors, and Marines engaged in the full spectrum of construction, combat engineering, and assured mobility missions—which included wood frame construction, route repair, bridge repair, route clearance, security escort patrols, direct support to maneuver units in kinetic operations, and most important of all, support to Iraqi military and security forces. There was clearly a lot of learning, synergy, and cultural sensitivity that took place to keep the engineer missions moving forward on a daily basis. The 46th learned a great deal during its deployment to share with fellow engineer units.

Language Barrier

When venturing to a new place, the first thing Soldiers need to learn is how to speak the local dialect—something a person traveling to a different area in the United States might also need to do. Similarly, fellow military professionals are often separated by a common language. Marines are part of the naval service and the naval traditions. Therefore, even in the middle of the desert, nautical references abound. This became apparent during the construction of an Iraqi security forces (ISF) base camp. The mission to build infrastructure for ISF troops was a joint operation with Alpha Company, 46th Engineer Battalion, attached to NMCB 22, a Reserve Component unit from the 30th NCR. Adapting to nautical dialect was a challenge. Shower and latrine trailers are "ablution units," a kitchen is a "galley," a "scullery" is a dish-washing facility, and living areas are "berthing spaces." Left and right are "port and starboard" and a wall is a "bulkhead." "Hooah" is "oorah" and "roger" becomes "aye–aye." Of course, this was reversed when Bravo Company—charged with erecting Southwest Asia (SWA) huts with climate control, central power grid, and force protection—was reinforced with a platoon from NMCB 40, an Active Navy unit from the 9th NCR. This time Sailors learned a "head" was a "latrine" and "cover" was "head gear." As a result, our Soldiers and Sailors not only learned new acronyms and nomenclatures but also how to immerse themselves in a different culture and succeed—a lesson that will help in many other situations where adapting to new things and new ideas is paramount to success.

Organizational Identity Crisis

As Army engineers, our organization identity is one of "fight-and-build" units, while all Marines take pride in the credo "every man a rifleman." The Navy sees things a bit differently. The NMCBs are organized as construction and construction management organizations. Both Active and Reserve Army Soldiers and Active and Reserve Marines within the NCR spend the majority of their training time honing combat skills (physical training, live-fire exercises, demolitions, and mine training), but less time on practicing core competencies (vertical and horizontal construction). Navy engineers, on the other hand, obtain "graduate level" skills (military occupational specialty for the Army). Among both the Active Navy and the Reserve Component of the naval engineer community, all personnel E-6 and above must have a professional license or certification. There are many licensed electricians, plumbers, master carpenters, and steel workers or welders. Every officer must earn a professional engineer certification and maintain a current license.

This gap in knowledge, skills, and craftsmanship between Army and Navy engineers is too big to ignore. So don't ignore it; use it to your advantage! The major reason for this gap is that Navy units are *construction organizations,* as opposed to Army or Marine engineer units that are *combat units*. The NCRs and NMCBs are more organizationally akin to the United States Army Corps of Engineers® (USACE) than they are to the Army's deployable engineer battalions and brigades or groups. There are two positives to this. First, it offers a unique opportunity for both combat and combat heavy engineers to learn while working with a Seabee unit. Many of our young carpenters, electricians, plumbers, and combat engineers will find that Seabees are more than willing to share their knowledge. Army officers can also learn a great deal from their Navy counterparts. Nowhere outside of USACE can a young officer learn more about planning, programming, and construction management than working with NMCB or NCR staff. Secondly, Seabees operating in a combat zone have a unique opportunity to learn about weapons employment, small-unit tactics, immediate action and reaction drills, vehicle identification, and many other tasks that will help them stay alive on the battlefield. Thus, there are many opportunities to share knowledge and help bridge the gap in organizational identity between the services.

Cultural and Institutional Differences

There are long-standing cultural and institutional differences between the Army, Navy, and Marine Corps team that Soldiers of all ranks need to consider in a

Photo by Captain Scott Updike

Seabees and Soldiers combine skills to erect formwork during a project.

Photo by Captain Scott Updike

A Seabee and a Soldier work side by side hanging trim on a SWA hut.

joint environment. The Navy rank structure is unique and the rights and privileges of each rank are very different. Marine rank structure is similar in insignia and nomenclature, but different roles and responsibilities are expected of each rank. Several examples are as follows:

- The Navy is more conscious about separating officers, chiefs (E-7 and above), and enlisted (E-6 and below). Each group has separate heads, berthing areas, recreation areas, and galleys, if possible. The Marines operate in a similar manner.
- The chief petty officer or gunnery sergeant (E-7 or above) is equivalent to a command sergeant major or first sergeant in the Army. If you need to make things happen, make one of these guys your first stop.
- A Marine corporal or sergeant (E-5) is expected to be a squad leader capable of leading patrols outside the wire. In the Army, such responsibility normally rests at the sergeant first class or lieutenant level. In the Navy, it is nothing to see a chief petty officer in charge of 50 personnel and 10 pieces of equipment on a $10 million high-visibility project. A chief is expected to be professionally licensed in at least one trade, have a degree, and know project management at a higher level than an Army captain or major.
- Saluting and uniformity is not emphasized. Sailors and Marines don't salute, and they have different uniform policies when not on duty. They work in hard hats and remove blouses or unblouse boots, while Soldiers work in helmets and full uniform. Also, Sailors and Marines don't have a standard physical training uniform.

These and many other differences exist between the services. Learning to work with these differences is a challenge that noncommissioned officers in particular must practice daily so Army standards and traditions are upheld, yet offenses to our hosts are avoided.

Additionally, there are many institutional differences that units should prepare for:

- The Navy is more meticulous on accounting and its Class IV supply and construction management; cost and schedule accountability procedures are more detailed. The Navy tracks projects by man-hours and uses the number of man-hours available or expended to determine how much work can be done. Physical training, meals, training, and maintenance do not count as man-hours expended toward a project according to the Navy. This created some problems in the beginning, because in the Army, it's part of our routine. In contrast, many Marine Corps systems are in some ways less time consuming than Army systems.
- Marine and Navy deployments are shorter than Army deployments. This led to some friction, especially when a new MEF or NCR arrived on its first deployment. Often this forced units task-organized to Navy organizations to reinvent standing operating procedures and tactics, techniques, and procedures every few months. Patience and cooperative attitudes by leaders go a long way toward establishing relationships that help accomplish the mission.
- Marines, like the Army, fight in small-unit teams that train, live, play, eat, and fight together as one functioning unit. Seabees are pooled into companies and pulled out and sent to detachments to complete a project under a chief or junior officer. When the project is over, the detachment separates.

Learning from Reserve Components

Many of the lessons learned from working with Reserve Component Seabees and a United States Army Reserve combat support equipment (CSE) company simply reinforced prior experiences with Reserve units. Among the new lessons learned, however, was that Reserve Soldiers and Seabees possess skills and abilities that

(Continued on page 16)

Battle-Tracking Tips for Junior Leaders

By Captain Jackquline N. Waddell

Battle tracking is not limited to battle captains, engineers, or maneuver units; it is used for every position in every branch of the U.S. military. When dealing with the demands from any facet of battle tracking, one thing is certain: there is no surefire approach to accomplishing it 100 percent error-free. People are human, and humans make mistakes. In fact, if a command is demanding, the battle tracker will probably experience a few growing pains while trying to get a handle on it. Battle tracking is best learned through experience. And later, these lessons learned will prove to be invaluable.

During Operation Iraqi Freedom, the 130th Engineer Brigade provided an opportunity to work in a corps separate engineer brigade as a battle captain. Entering the Iraqi theater for the first time as a newly promoted captain is definitely a fly-by-the-seat-of-your-pants type of experience. One useful thought for junior captains or noncommissioned officers (NCOs) responsible for battle tracking is that some of the most valuable learning points come when things are going wrong.

By understanding the intent and concept and implementing six simple control measures, anyone can tailor a unit battle-tracking system that could drastically reduce the discomfort generated from the entire process.

Intent

The intent of battle tracking is to facilitate the higher and lower and left and right exchange of information. The intent is simple, but the execution can be quite difficult depending on your personality, skills, and ability to establish good working relations.

One solid example of an environment that requires extensive battle tracking is a tactical operations center (TOC). A TOC is considered a nerve center or hub for planning, executing, monitoring, and reporting the status of missions. A TOC or a modified form of a TOC exists at every level in the military. The goal of battle tracking in a TOC is to monitor the execution of all tasks so the information is analyzed properly, ensuring that the information reported to higher headquarters is timely and accurate.

Concept

The concept is one that is completely fluid and is mission-dependent. It is important to understand that the concept is only as effective as the person implementing it and requires tailoring for every position in a unit. It depends on a unit's specific mission and changes with every mission. If someone is not receptive to change, the battle-tracking process is difficult. Most people do not attend a course or field training exercise that prepares them for what is required from a unit with a high operating tempo that demands intense situational awareness.

Control Measures

The control measures can be categorized into six areas: proper personnel allocation, preparation and training, battle rhythm identification, situational awareness, accurate information reporting, and effective communication.

Proper Personnel Allocation

When a unit is told to deploy, it should not procrastinate. Leaders must backward plan, obtain critical dates, and allocate personnel appropriately. Leaders should evaluate deployment-related positions and assign Soldiers to those positions according to the skills and abilities they possess. If not, the deployment can be quite challenging.

It is not advised to assign Soldiers to slots just to fill them, because not everyone will perform battle tracking efficiently. If a Soldier easily understands concepts; pays attention to detail; and speaks in clear, concise sentences, this Soldier should be considered for employment in a TOC position.

Preparation and Training

If at all possible, assign demanding positions in advance and allow Soldiers assigned to the TOC to train, deploy, and redeploy in those assigned positions. Usually, Soldiers assigned to battle-tracking positions in a TOC are senior enlisted or junior officers and are employed as battle NCOs and captains. Those are also the same Soldiers who are made responsible for executing or monitoring the unit's pre-deployment preparations.

Do not allow the personnel assigned as future battle trackers to spend all of their training time monitoring container loading or duffle bag painting. These Soldiers need to train realistically and often. Do not allow training to be overlooked or make scenarios easy just to check the block and get them out of the way. The training needs to set a standard that conveys a worst-case scenario so all Soldiers get a good grasp of what may be encountered, how it should be handled, and what information analysis needs to be conducted.

Rafting and construction operations are just two of many possible missions a unit would track.

Once in-theater, a leader can't expect a Soldier to effectively track the battle or perform to standard if a clear standard was never established. Unless absolutely necessary, leave the Soldiers in their assigned positions for the entire training, deployment, and redeployment process. Ensure that every Soldier is cross-trained to seamlessly cover down in the event of any loss of personnel. Once the unit is engaged, the time required to train anyone hinders the entire battle-tracking effort.

Battle Rhythm Identification

Battle tracking is usually defined by a battle rhythm or a command schedule of events. There will always be implied or specified suspense dates for products or briefings. As soon as possible, identify the section's or unit's battle rhythm, the pertinent suspense times, and the information your section is required to compile. Institute a calendar showing every suspense date, and use it as a backward-planning tool. By doing this, it is easy to implement controls or systems, which in turn aids in the battle-tracking effort.

Systems and tracking devices have proved to be one of the most critical tools in battle tracking. Establishing solid guidelines is essential to ensure that operational missions (such as route clearance, construction, and casualty operations) or Soldier-related issues (such as Red Cross messages) are not missed. As a rule, anything that requires an action, a reply, or a report needs to be tracked.

There should be a system developed for every task required by your section, and all systems should be documented. This isn't something that has to be dramatic or complex: just something that outlines the basic procedures. Establish a tracker for every task required so the status can be briefed at any given time and kept updated and archived. Keeping archives may seem completely mundane, but—once in place—it becomes second nature. This will ensure that any question, even if it was an issue or concern from a previous month, can be easily referenced and answered. Every unit will lose personnel for one reason or another, and it is much easier to cross-train new personnel if tracking procedures are in place.

Situational Awareness

Ensure that Soldiers have situational awareness of everything going on, whether it directly affects them or not. Make a log, and use it for operational notes; have the Soldiers write as they go because they will need to refer back to their notes. Do not leave Soldiers in the dark by hoarding information. Sharing information with them encourages them to share information also.

Talk to superiors, Soldiers, and adjacent units, and establish sound points of contact. Take the time to know what missions are going on 360 degrees around your section. Do an informal "what's hot" session with your immediate personnel, and go over upcoming, current, and completed missions regularly. There will be times when Soldiers will be stopped and asked mission-related questions. The information they know or do not know is a direct reflection of their battle NCOs or captains.

Accurate Information Reporting

When a section is required to report something, make sure the information is accurate and on time. Information reporting and battle tracking go hand in hand. If the information provided is inaccurate, the Soldiers look incompetent and—depending on the mission—Soldiers could get killed. An implied task is ensuring that every piece of information or report that leaves your section is right. If it is an electronically generated document, don't just hastily put it together; learn how to use the spell-check function effectively.

Effective Communication

Without effective communication, both verbal and written, battle tracking is useless. One of the primary goals is to make it easier to report information on the status of a unit's missions to higher headquarters. In any position, the battle NCO or captain has to be able to communicate the information effectively to Soldiers, superiors, the command, and other units. Every Soldier communicates, but not every Soldier communicates effectively. Understand that effective communication is achieved only when the information exchanged is relayed and understood by both parties. Without effective communication, the mission becomes confusing, and the intent is lost.

If you are unclear in your intent, or don't prepare and rehearse your brief, you won't be taken seriously, and the value behind your input is lost. Take the time to think about *what* to brief before briefing it. If you sound as if you don't know what you're talking about, then what you're trying to convey will be dismissed. If something isn't known, make sure it is stated as unknown, then take notes, find the answer, and report back. When speaking to any command, provide only the information that is relevant. The command usually wants to know up front the bottom line, and giving too much information loses their attention and your intent.

Summary

Battle tracking is not easily mastered, and there are often situations that Soldiers and leaders are not prepared for. Taking the initiative to identify and understand what is expected in battle tracking sets the unit—and the mission—up for success. Establish a plan for whatever positions there are, and afford Soldiers time to prepare and train in their assigned positions. Planning ahead will make the transition from garrison to deployment easier for all concerned. Communicating with personnel on current issues—as well as what is expected and when—and training them how to communicate effectively will have profound rewards. These common sense things will ensure that the unit and its Soldiers are seen as professionals and what they say will be taken seriously.

Captain Waddell is the S-3 operations battle captain for Headquarters and Headquarters Company, 130th Engineer Brigade. Her previous positions include assistant adjutant, adjutant, executive officer, company rear detachment commander, and assistant S-3.

("Culture Clash," continued from page 13)

far exceed their job descriptions due to civilian life experiences. An example is the vertical construction completed by a CSE company; they built SWA huts and completed other projects normally assigned to a general construction platoon. The Reserve Seabees also displayed a similar diversity of skills. Perhaps the biggest lesson learned was the different administrative systems.

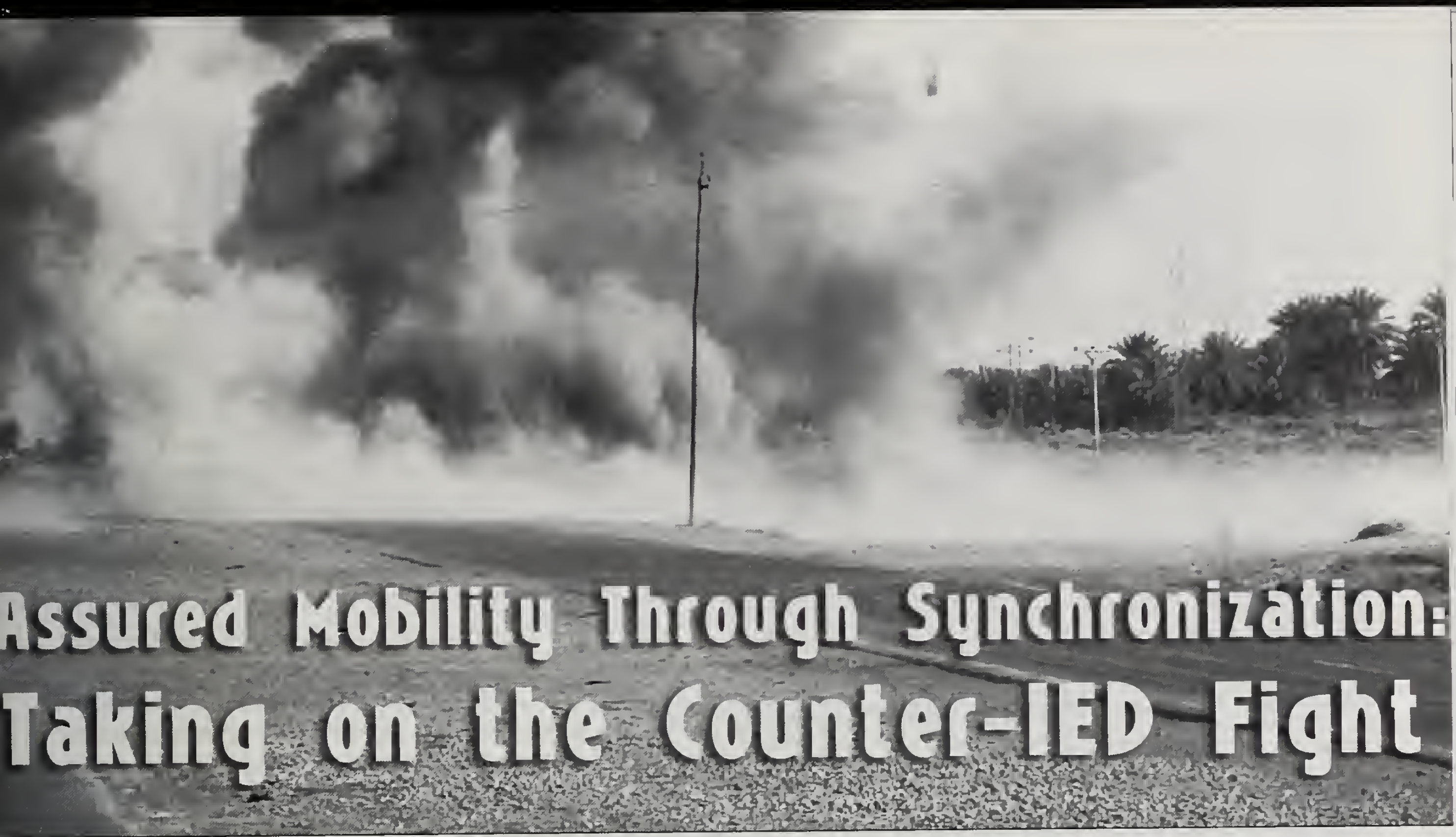
Working in an environment with so many Reserve Soldiers and Sailors provided a great opportunity to appreciate the skills brought to the fight and to learn the logistics and administrative Reserve systems—knowledge that will benefit engineers as they deploy more often as multicomponent teams.

Conclusion

The 46th Engineer Battalion learned many lessons, improved its understanding of joint operations, honed many skills, and executed many missions. Alpha and Bravo Companies worked as task force engineers, providing close combat engineer support to kinetic operations conducted by maneuver task forces. Simultaneously, the CSE company built a bottled water plant for the Marine Logistics Group, while Sailors and Soldiers worked side by side establishing ISF strongpoints, outposts, and base camp facilities. No matter what the counterinsurgency fight demands, the 46th is now better prepared to support any campaign plan. Its experiences provide a road map for fellow units by demonstrating the language barriers, cultural and institutional differences, and other challenges that can be expected working in a joint, multi-component environment during combat operations. They forged a legacy of cooperation across cultural and operational lines of services that provide a better understanding of capabilities across the entire joint engineer team.

Major Payne is the S-3 for the 46th Engineer Battalion, 130th Engineer Brigade. Previous assignments include platoon leader for the 44th Engineer Battalion (Combat) (Mechanized); platoon leader and executive officer for Bravo Company, 46th Engineer Battalion; assistant S-3 and commander for the Headquarters and Headquarters Company, 11th Engineer Battalion (Combat) (Mechanized); company commander and staff officer for the 1-395th Engineer Training Support Battalion; and Deputy Area Engineer, Tikrit Area Office, USACE Gulf Region Division–North District at Forward Operating Base Speicher, Iraq. He holds a bachelor's from Virginia Military Institute.

Lieutenant Colonel Anderson is the commander of the 46th Engineer Battalion, 130th Engineer Brigade. Previous assignments include platoon leader and executive officer, 52d Engineer Battalion (Combat); staff officer and bridge company commander, 36th Engineer Group (Combat); battalion S-3 and executive officer, 84th Engineer Battalion (Combat) (Heavy); and staff officer, Office of the Chief of Engineers, Headquarters, USACE. She holds a bachelor's from the University of Southern Colorado and a master's from the University of Georgia.



Assured Mobility Through Synchronization: Taking on the Counter-IED Fight

By Captain Amber N. Schleuning

As corps engineers during Operation Iraqi Freedom (OIF) 05-07, the 130th Engineer Brigade assumed the responsibility of clearing the Multinational Corps–Iraq (MNC–I) main supply routes (MSRs) of improvised explosive devices (IEDs) and other obstacles. Clearing IEDs proved to be a challenge not only tactically, where the rubber meets the road (*we were reminded every day that the enemy "has a vote"*), but also operationally, at the brigade level of planning and decision making. The fundamentals of assured mobility were identified and understood early in the fight. The challenges were nested in the resources.

Situation and Mission

The mission of clearing the MSRs was given to the 110th Engineer Battalion, which was under the operational control of the 130th Engineer Brigade in support of OIF 05-07. Working in teams, the battalion cleared IEDs, unexploded ordnance (UXO), and other hazards in an area of operations with more than 300 kilometers of roads, dirt, overpasses, and canals. The goals were to clear the routes for coalition forces and deny the anti-Iraqi forces terrain and freedom of maneuver. Daily clearances required the route clearance teams to travel diverse terrain and urban environments, in addition to several different operational environments, making seamless movements difficult.

The 110th developed a working relationship with maneuver elements involved in their current operations. As the route clearance teams or operational environment owners discovered IEDs, the site was cordoned off, the incident was reported among forces, cordons were turned over, and details were exchanged. With the brigade mission of *assuring mobility*, the focus was on long-term operational planning. The counter-IED fight was more pervasive than the day-to-day success of the route clearance team. To achieve absolute success—allowing the force commander the ability to move and maneuver where and when he desired without interruption or delay—the fundamentals of assuring mobility needed to be properly executed.

The six fundamentals of assured mobility are—

- *Predict* actions and circumstances that could affect the ability of the force to maintain momentum.
- *Detect* early indicators of impediments to the battlefield mobility using intelligence, surveillance, and reconnaissance (ISR) assets; identify alternatives; and establish surveillance.
- *Prevent* potential impediments to maneuverability from affecting the battlefield mobility of the force by acting early; monitor and protect cleared routes.
- *Avoid* detected impediments to the battlefield mobility of the force; if prevention fails, identify alternatives.
- *Neutralize*, reduce, or overcome (breach or, in this case, have explosive ordnance disposal personnel destroy or remove) impediments.
- *Protect* against threat force weapons and tactics, techniques, and procedures through the application of technology or tactical behavior. This is a continuous process.

Assured Mobility Basics From the Corps Engineer Brigade Commander's Perspective

- Get the most out of and integrate enablers to attack the enemy across the spectrum of countering IEDs from *predict* to *protect*—this is a combined arms fight.
- Set and sustain a team objective to achieve success in assured mobility.
- Ensure a steady state of give and take between maneuver and route clearance teams.
- Consistently share analysis with brigade combat teams (BCTs) and task forces. Everyone adds a piece to the puzzle to defeat the enemy's actions.
- Integrate with operational environment owners—frequent face-to-face coordination and liaison officers are essential. Constant communication is essential because the battlefield changes constantly.
- Synchronize with maneuver combat patrols.
- Coordinate and share information with MSR users.
- Execute proper tactics, techniques, and procedures. Ensure security always.
- Protect Soldiers and equipment.
- Increase route clearance team time by embedding explosive ordnance disposal (EOD) assets rather than waiting for EOD personnel.
- Sustain an aggressive route sanitation and crater repair program.
- Predict and make the right changes. Don't get into a rut with route clearance scheduling and targeting—the enemy is always changing.
- Work hard every day to make a difference.

A route clearance team searches for IEDs and UXO.

Brigade Operations in Synchronization

In order to "hit on all cylinders" in the counter-IED fight, the 130th Engineer Brigade created an Assured Mobility Synchronization Cell (AMSC). Field Manual (FM) 3-34, *Engineer Operations,* cites assured mobility as the actions that guarantee commanders the ability to maneuver where and when they desire without interruption or delay to achieve the mission. It requires the understanding of the friendly and enemy actions and the three-dimensional operational environment (subterranean, ground level, and aerial) to permit commanders to act first within the threat opponent's decision cycle. Thus, the cell's mission housed the six fundamentals aiming to track and synchronize route clearance teams, logistical convoy movements, maneuver operations, ISR assets, and other engineer enablers.

The AMSC's first priority included determining the steady state maneuver missions, operational environment owner clearance efforts, and combat patrol capabilities. A detailed targeting process allowed the AMSC to position the route clearance teams so they achieved "time on target" and were integrated in and around ongoing maneuver combat patrols. Adding the layer of tracking logistical convoys, the AMSC needed to ensure that the routes were cleared of IEDs and UXO to safeguard the timely movement of personnel and equipment in-theater. Finally, acknowledging that the threat was *thinking* and would *adapt* to our operations, ISR (the combat multiplier) assets were overlaid and tracked.

Conclusion

The dynamics and resources available in Iraq are constantly changing. Every rotation is unlike the one before. This article is offered as after-action review comments that might possibly be integrated into planning and considerations for the "next round." In the end, the constant that remains is the need for a combined and synchronized force when tasked with the mission of assuring mobility. Without the synchronization of the force, success in the fundamental engineer task of assuring mobility will always be in question.

Captain Schleuning is the 130th Engineer Brigade Assured Mobility and Synchronization Cell officer in charge, deployed in support of Operation Iraqi Freedom 05-07. Previous assignments include platoon leader during Operation Iraqi Freedom, assistant S-3 operations officer, and brigade maintenance officer. She holds a bachelor's in biology from the University of Colorado, Boulder, Colorado.

Powering the Forces

By Captain Esther S. Pinchasin and Captain James S. Boyette

Soliders splice a medium-voltage distribution cable.

The 249th Engineer Battalion (Prime Power) trains for worldwide deployment to provide prime power electrical solutions and electrical-systems expertise in support of military operations and the National Response Plan. Operation Iraqi Freedom continues to present daily challenges of environmental and logistical obstacles, which the "Black Lions" successfully overcome. Gone are the days of the quick-and-easy Force Provider module forward operating base (FOB) in a box! Our restructured footprint requires comprehensive and flexible power planning, and the prime power production specialists provide the knowledge necessary to meet the theater's increasing power requirements.

The Soldiers of the 249th Engineer Battalion possess a variety of capabilities to support military operations, such as installing and operating prime power plants, providing technical power-related guidance, and serving as technical assistants to the contracting officer's representative (COR) for power projects. The Army's prime power production specialists assist in the connection of base camps to local commercial grids (which establishes the secondary backup system and helps eliminate the dependency on contracted power generation equipment). This is not currently being accomplished in Iraq because the national grid is unreliable and incapable of providing consistent power to the Iraqi population. The final objective and a measure of success will be the connection of bases to the commercial grid, utilizing it as the primary power source.

Military-constructed and leased power plants provide electricity for all contingency operating bases (COBs) in Iraq. The smaller FOBs are powered solely by spot generation (which consists of many low-voltage generators referred to as tactical generators [TACGENS]). The Soldiers of the 249th support base commanders and area support groups in their efforts to maximize the use of the government-purchased and leased power generation systems, implement load-sharing programs during peak power demands, and ensure the safe and efficient operation of the utilities infrastructures sustaining allied forces.

In 2003, the existing electrical infrastructure at most of the COBs was cannibalized, destroyed, or severely damaged. The 249th conducted battle damage assessments and repaired enormous portions of the distribution systems to enable operations. They put miles of power distribution lines in the ground and stood up life-support areas all over Iraq. Since then, power production equipment has been leased and purchased, and the role of the 249th has changed to one of assisting the Multinational Corps–Iraq (MNC–I) with the proper utilization of the newly acquired resources.

Prime power specialists have been conducting electrical assessments of facilities, compiling required bills of materials, computing load estimates and projected power requirements, as well as designing and installing low- and medium-voltage power distribution systems for base engineers. They have taken on the critical tasks of overseeing project execution, ensuring the quality control of the contractors' work, and providing technical assistance to both theater and the United States Army Corps of Engineers® CORs.

At one logistics support area (LSA), the 249th oversaw the construction and installation of overhead power distribution lines covering the entire base, to ensure that the Army received what it paid for with taxpayers' dollars. The LSA had more distribution capability than power available, which is rarely the case; therefore, the plan was to double the size of the existing plant and provide power to more than 90 percent of

A Soldier works at troubleshooting an electrical fault.

the base, using minimal spot generation. This directly reduced fuel and maintenance costs and maximized power production capability on the LSA.

A prime power team at one COB in Iraq worked diligently to stand up utilities operations. The base is mostly powered by costly spot generation—which is operated, maintained, and fueled by contractors. The objective was to reduce our dependency on the inefficient spot generation and utilize more of the leased-plant capacity. The prime power team also assisted in upgrading the electrical infrastructure, provided quality control for the contracted work, and completed several technical troop-labor missions. The 249th worked aggressively to connect to the existing grid the major power users, the critical facilities, and the facilities that do not require an extensive bill of materials. Working alongside the MNC–I C-7 (engineer staff section) Power Cell, they produced a theater power plan to meet future power demands and assist in the programming of funds for upcoming power production requirements. The current plan, to add megawatts to the COB power plant, will guarantee power support to the base. The 249th engaged in assessing and prioritizing facilities to carry out this course of action and guarantee the COB's ability to handle the summer power surge demand.

Over the last twelve years, the 249th has deployed and worked with engineers from all over the world. However, in Iraq, they had the rare opportunity to work directly with United States Marines at a base that was abandoned by the Iraqi army and subsequently looted, rendering the main power bunker inoperable.

Most of the distribution system was in a horrible state of disrepair, and all the substations were nonmission capable. They were directed to restore the power distribution system, which was accomplished successfully with limited resources and materials. These prime power production specialists repaired the existing internal electrical systems and enabled occupancy of the buildings on the COB.

They also located and disabled high-voltage feeder cables to the base, arresting the barrier system without any electrical diagrams, required tools, or diagnostic equipment. They resourcefully consolidated all unused transformers, switchgear, and high-voltage rated cable to quickly determine the serviceability of each item and set up a cannibalization, testing, and repair shop to repair complete substations with zero cost to the U.S. government. The prime power Soldiers conducted reconnaissance and assessment of more than 200 facilities and collected repair parts and materials to restore the electrical capability to each facility.

Today, the 249th continues to build on past successes. It works closely with the area support group's electrical team to repair and maintain the power distribution system and supervise the operation of the base-leased power plant. The team also repairs cable strikes, conducts substation maintenance and repair, and corrects faults in the underground distribution infrastructure—which was built in the early 1980s. The unit is also looking ahead and working on the expansion of the power plant and has already developed the power projections.

The 249th Engineer Battalion, the only prime power unit in the Army, is comprised of professional Soldiers who are the theater's technical experts on commercial-grade medium-voltage power. They continue to operate out of the major COBs in Iraq, supporting the entire area of operations, providing the outlying FOBs with technical expertise, and identifying life-threatening electrical safety hazards. The Soldiers of the 249th will continue to rotate in and out of Iraq and Afghanistan, covering both areas of operations, to support thousands of U.S. Soldiers, Sailors, Airmen, and Marines.

Captain Pinchasin is attending graduate school for construction engineering at Stanford University and will serve with the United States Army Corps of Engineer upon graduation. Her previous positions include platoon leader, executive officer, S-3, battalion S-4, company commander, battalion liaision, and adjutant. She holds a degree from Boston University and has attended the Aviation Captains Career Course and Combined Arms and Services Staff School (CAS3).

Captain Boyette is a small-group instructor for the Engineer Officer's Basic Course. His previous positions include platoon leader, support platoon leader, executive officer, assistant S-3, and battalion liaison officer. He has a bachelor's in management from National American University.

The Corps Engineer Brigade Construction Mission—

A Joint and Combined Arms Effort

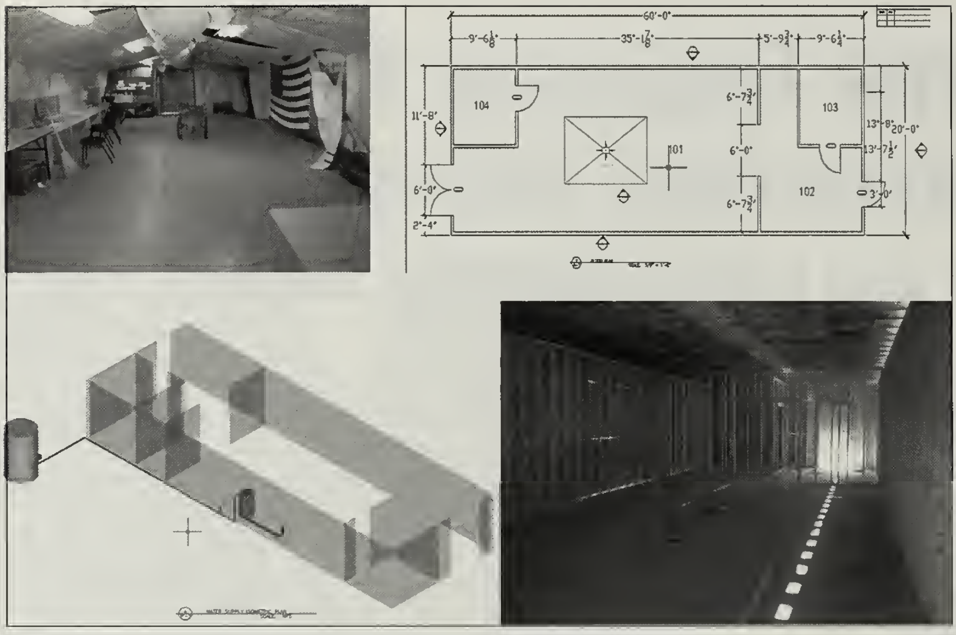
By Major Tyrone Bennett

As military engineers continue the transformation process, the corps engineer brigade is continuing to provide senior engineer leadership by focusing on the corps commander's priorities within the area of responsibility (AOR). Will this association become a thing of the past, or will it remain steadfast in the current command and support structure? In the meantime, the missions keep coming. If the corps is serving as the joint task force (JTF) or Multinational Corps, then the subordinate engineer brigade is equally postured for command and control of the engineer structure. The responsibility of providing construction and master planning during current operations spans all the services, to include specific Army branches. The corps engineer brigade has a unique challenge of balancing the corps's priority for the construction and master planning effort with an inherent relationship with the United States Army Corps of Engineers®—which is the Gulf Region Division. The invariable requirement for continued infrastructure improvements, to include assured mobility, has prompted other services and Army branches to become noticeable contributors in the overall processes.

The joint and combined arms involvement is visible when other services provide their construction and master planning unit in lieu of an unavailable Army capability normally under the corps engineer brigade's command and control. Some examples of the in-lieu-of capability are showcased by the United States Air Force's facility and utility detachments. The combined arms effort is not as perceptible and does not fall under the corps engineer brigade's direct control, but these units are equally as important to the construction and master planning effort. A few of the primary contributors to the combined arms construction effort to highlight include finance and contracting, Defense Contracting Management Agency (DCMA), and almost every aspect of logistics (corps support command [COSCOM]). All services are transforming, and units are receiving updated nomenclatures.

The effort provided by the Air Force facility and utility detachments is clearly defined: They are replacing similar Army facility engineer teams (FETs) and utility detachments because these particular standard requirements code (SRC) units are not available or are just off-cycle for purposes of operational rotations. It's very apparent that strict attention should be given to certain low-density SRC units that have witnessed the brunt of the engineer's operational turbulence. The continuous and sometimes increased need for utility

The versatile 803d Utility Detachment executes various missions: Top left – final grade for vehicle staging area; Bottom left – fence improvements for force protection; Top right – traffic speed bump emplacement; Bottom right – final survey shots for drainage and elevation.



An example of design work provided by the 732d Expeditionary Civil Engineer Squadron, Facility Detachment 15: Top left – expeditionary mortuary affairs operation; Top right – modified Southwest Asia (SWA) hut design to replace tent; Bottom left – 3-D view of structure with drainage system; Bottom right – construction of new mortuary affairs facility.

detachments and FETs are trends that must be addressed sooner rather than later.

The Army and Air Force utility detachments are valuable when it comes to making immediate impacts to infrastructure improvements and the construction of almost any type, not to exceed certain project scopes. The Army made a doctrinal decision in the late 1980s to move all utility detachments to the Reserve Component. This positioning decision may take another blow if current transformation plans completely eliminate the SRC. As a result of the increased need and almost uncontrollable operating tempo (OPTEMPO), the requirement for utility detachments has spilled over to the other services—the Air Force being the first formalized contributor. Currently, the corps engineer brigade is responsible for managing all of the utility detachments in the present operations within the corps's AOR.

The Army FETs are also a much sought after, low-density engineer unit whose existence became essential dating back to the Balkans. The turbulence from the current operations has prompted the Air Force to provide an equivalent capability in lieu of the stretched Army FETs. The Air Force facility detachments are assembled individual skill sets based on the Army FET structure and have successfully delivered the master planning needed under the corps engineer brigade's requirement for managing a master plan at the priority base camps.

There are some unique challenges that accompany every joint effort, regardless of the familiar skill sets. After working with sister services in a joint military construction effort, frequent challenges with processes used for resourcing the projects have become apparent. Every service has its own process for requisitioning and funding projects, but in a joint environment all services must increase the synergy around the particular service recognized as the executive agent. All too often, requesting agents or customers focus solely on the engineering aspects of the construction requirement, and the material requirements start off behind the timeline—thus creating a project lag.

Preventing a project lag is where the combined arms concept becomes apparent and very essential to the timeliness of the project. The military construction designs can be performed by Soldiers or civilian engineers, but both options require assistance from finance and accounting. The DCMA has area contracting officers who help enforce government contract standards in support of military bases. Ultimately, DCMA is responsible for ensuring that federal acquisition programs, supplies, and services are delivered on time. Normally, the requisitioning unit relies on the military's supply system and transportation units to deliver precious material. This all seems like a routine process until another service attempts to use an unfamiliar process like this from beginning to end.

As the number of engineer brigades is reduced, the versatility of existing brigades operating in support of the deployed corps headquarters will continue to increase across service lines. The Army is seeing the Air Force take an active role in filling requirements in lieu of Army units like the FETs and the utility detachments. There are several key Army branches that have some critical, behind-the-scenes roles regarding successful construction projects within the corps engineer brigade and throughout the corps's AOR. As the Air Force and other services take on additional responsibilities in the theater of operations, the need for understanding the Army's processes will become an overarching task. The utility detachments are underappreciated and should remain in the structure as versatile construction units.

Major Bennett is the S-3 construction officer for the Multinational Corps–Iraq Corps Engineer Brigade. Previous assignments include Korea, Fort Stewart, Haiti, Fort Bragg, Fort McPherson, Saudi Arabia, and Germany. Previous duties include bridge platoon leader, facilities engineer, company commander, and plans and operations officer.

DO YOU THINK OR DO YOU KNOW?

By Staff Sergeant Travis Y. Johnson

Knowing the answer to the question "Do you think or do you know?" can mean the difference between success and failure during a deployment. What you *think* is something you've been told. What you *know* is what you have done or seen. For example, surveying in an underdeveloped nation or nonpermissive environment is not the same as surveying in a peacetime western environment. Successful predeployment training and relief in place (RIP)/ transfer of authority (TOA) when arriving in-theater will close the gap between the two and set the stage for successful deployments. The missions may vary a great deal, yet it all comes down to whether or not personnel think they know or actually know successful deployment procedures. While supporting the 130th Engineer Brigade in Iraq, Detachment 8, 412th Engineer Command (ENCOM), United States Army Reserve, was given survey missions that required all of their combined civilian and military backgrounds. This included previous continental United States (CONUS), overseas, and combat experiences molded into a proven procedure: beginning in predeployment training, continuing through RIP/TOA, and being continually refined during operations in Iraq. This successful deployment procedure involves more than the simple collection of data and can be broken into six steps. The unit—

- Must have the proper equipment for the job (most important).
- Should have training beyond the basic "schoolhouse" understanding of the equipment.
- Must have an understanding of survey principles and be able to apply them to the mission.
- Must know what data collection standards are required.
- Should be prepared for theater-specific issues.
- Should be prepared for changes.

If not managed correctly, all these things (individually or collectively) can lead to mission failure or loss of a Soldier. In-country survey missions should only be done once. Sending a team twice due to mission failure in CONUS just means that time was wasted, but sending Soldiers back out in a combat theater can cost lives.

Photo by Staff Sergeant Travis Y. Johnson

Two survey Soldiers take field notes and set up the Geodimeter 5600.

Tools of the Trade

Total Station

The traditional survey tool is a "total station," which is a conventional survey system with an instrument usually referred to as a *gun*, plus required prisms, poles, tripods, batteries, and tripod-mounted levels called *tribrachs*. Until recently, the Army version of this set was the Geodimeter® Automated Integrated Survey Instrument (AISI) 444. This instrument is more than 13 years old and is no longer used professionally in surveying. To meet mission requirements, Detachment 8 acquired the Geodimeter 5600 Servo Direct Reflex (DR) 200+ with the Trimble® Automated Control Unit (ACU) Survey Controller as the gun. The gun is capable of measuring 5,500 meters to a prism with two-second accuracy over that distance or roughly 5 centimeters. This is a line-of-sight system and was acquired with global positioning system (GPS) gear to be used as a stand-alone system or together. Although not standard military equipment, the United States Army Engineer School, Fort Leonard Wood, Missouri, recently adopted the 5600 gun with a slightly different control module, the Geodimeter Control Unit (CU), which is more closely related to the AISI 444 operational procedures.

Global Positioning System

The GPS acquired to meet mission requirements is the Trimble 5800 Real-Time Kinetic (RTK) Rover. The main component is the Site Positioning System (SPS) 780 Rover series with base option, which is an antenna that can be used as either a GPS base station or as a rover. A rover collects RTK GPS data while moving. The rover vehicle can be any platform, but is typically an all-terrain vehicle like the Polaris Ranger® 4x4, which needs only minor modifications to mount the survey rod. This GPS requires an attachable data collector, the Trimble Survey Controller 2 (TSC2), which can be interchanged with the base, the rover, or the gun. This system measures at an unadjusted accuracy of 1 to 3 centimeters.

Software

The Army trains and supplies Terramodel™ civil design software developed to use with Trimble equipment. Other software supplied and trained by the Army is AutoCAD 2004, but AutoCAD 2004 Land Desktop Development (LDD) and other Autodesk civil design series components are also available. Conversion and data management software packages are required, such as Geotrans V2, Convert 4.08, Trimble Data Transfer, and Trimble Geomatics Office. No single software package could satisfactorily meet all missions; the combination of all this software was essential to the various missions and their changes. Nontechnical but important software in creating a final product is Adobe® Acrobat® Professional, which allows almost any technical output to be made into a portable document format (PDF) that any client can view.

Predeployment Training

Predeployment training is mandatory for all deploying Soldiers. There are core, theater-specific tasks, such as convoy operations, that all services mandate. Military occupational specialty (MOS) 21T technical engineer specialists, like all Soldiers, need to train in their job-specific tasks. However, unlike 21B combat engineers, 21Ts are low-density, and not many qualified and experienced trainers are available. A 21T must be an expert not only in surveying but also in drafting, computer-aided drafting (CAD), soils analysis, concrete quality control, and other critical technical engineer jobs that require considerable training and experience after the initial schooling (military or civilian). If they only have schoolhouse or basic MOS training, the odds are that they only think they know the job.

A train-the-trainer atmosphere is perfectly suited for correcting this problem. Given sufficient lead time, a 21T trainer from the Engineer School or from a training brigade may be available. Local vendors for survey equipment may be able to provide hands-on training that can be very important. Even a single experienced noncommissioned officer can successfully mentor school-trained Soldiers during predeployment training. It is also important that unit leadership be thoroughly familiar with all the software, hardware, and applications in order to set the missions for success in planning, logistics, and specifications. Finally, advance coordination with the unit being replaced can ensure that "right-seat/left-seat" training (working side by side with someone familiar with the job), using actual ongoing missions, will use the RIP/TOA period to build on predeployment training and bring the incoming unit up to full speed.

General Survey Principles

There are a few general survey principles that need to be reinforced during predeployment training. These principals are proper point coding, site identification, and the location or placement of benchmarks. Errors in these tasks must be caught and corrected on-site, without slowing the progress, or the entire survey could be wasted. Drilling the steps for each principle as a battle drill would ensure the Soldiers' confidence both in themselves and the equipment.

Point Coding

Proper point coding steps vary with the equipment, but the principle remains the same. Point coding is how the surveyor assigns identifiers to points. Often a 21T other than the surveyor uses the data to develop drawings. There may be multiple surveys, potentially creating confusion with data sets. Some coding conventions will not be read in by the software. You have to know your equipment. Having a key to the codes as part of the job files eliminates whether people know or only think they know the data codes.

Site Identification and Benchmarks

Proper site identification and benchmarks are also important for mission success. Do the surveyors know that they have enough data at the end of a mission or do they only think they have enough? Everything should be collected. Experience shows that projects can expand or become new projects. In-theater, many clients don't fully understand how to translate their needs into technical requirements that can also result in additional work. Extra data can make a new survey unnecessary. Available benchmarks should be located in all surveys. Benchmarks make project handoff, map location, and accuracy markedly better. Also, proper field notes streamline surveying, data use, and the ability to effectively change in the middle of a mission.

Photo by Sergeant Adam Russell

A Soldier stakes off a base station setup, which is a temporary benchmark for the survey.

It is better to have the data and not need it than to need it and not have it. However, time constraints can make it difficult to get these extra details, particularly if the survey crew has to take considerable time on-site working out the details of the survey. A site visit before the survey with all key project members—to include the client, the designers, and the construction supervisors—is essential for mission success. It ensures that the survey leaders can better plan the site work by seeing it, the client's needs are worked out on the ground and understood by all, and data needs are thoroughly understood.

Collection Standards

Do the survey crews know how to perform the survey accuracy standards for the mission? The civilian standard of surveying is much more stringent than that of an average military surveyor, yet those higher standards are required for United States Army Corps of Engineers® or military contract projects that the surveys support. The difference is in accuracy and legality. Civilian surveyors are required to know property laws and geospatial information systems (GISs) and be able to pass licensing exams. In most states, they must have attained a bachelor of science degree. Military surveyors are not held to the same standards. However, in-theater missions can require civilian levels of expertise, and not being able to execute those missions can delay large projects until civilian contractors are available and funded.

Something normally practiced by civilian surveyors, but not by the military, is the use of an Online Positioning User Service (OPUS) for GPS coordinate correction. This system has been recently set up in-theater and is monitored regularly. The website is <*www.ngs.noaa.gov*>. Using this service ensures that the surveyors and designers know that benchmark data is correct rather than only thinking that it is.

Theater-Specific Encounters

Force Protection

Force protection is always an issue in-theater. The leader for any mission should know the potential threat for the site and for travel to the site. Unexploded ordnance (UXO) could be found on a base where future construction is planned. A route survey can encounter improvised explosive devices (IEDs) and small arms fires. Even secure bases can receive mortar or rocket attacks. These are just some of the challenges survey teams have experienced. Unit planning must ensure that all coordination is made, to include accounting for the amount of equipment being transported for a mission and ensuring that the security team understands the needs of the survey team. Environmental considerations include high heat, wildlife (such as scorpions and vipers), and cold weather or rain (depending on the location and the season).

Drainage

Drainage is a significant issue in-theater for surveyors as well as for designers. The soils in many of Iraq's populated areas are alluvial silts that seal against water shortly after being wetted instead of allowing water to filter into the ground. The topography of most bases is flat and not conducive to proper drainage. On many bases, gravel is used to "put boots and wheels above the water." This makes the situation worse. Units are in-theater for a year or less and typically do not see the long-term effects. For the surveyor, it may mean recording a point on the top of the gravel and then digging below the gravel to record a point at ground level, both for drainage and

After using a rover-mounted GPS to survey a 1,000-acre site in southern Iraq, a comprehensive drainage plan was developed from the 3-D data using Terramodel.

gravel removal. A site must be designed to drain properly by not draining into another site, which would cause problems there. All drainage structures have to be identified and verified by the surveyor. Whether a site or project will drain properly is something that one must know and not just think they know. Aside from making the area a muddy waste, improper drainage can undermine slabs, roads, and other structures and allow pooling for insect breeding.

Global Positioning System Capability

Several units in-theater have reported a lack of GPS capability. This is in direct relation to them thinking they know the equipment and actually not knowing it. The GPS will likely encounter problems, and a thorough knowledge of the systems is required to fix these problems. Another common issue is GPS elevation variances that do not match the topography across a project. The fix for this is to place multiple base station control points on-site and locate them relative to each other, then use differential leveling within the software package to eliminate the error. A second fix for this problem is to do a "cooked point," which takes at least three hours of data collection in a FastStatic or similar surveying procedure, and send the data files in a receiver independent exchange (RINEX) format to OPUS for correction.

Operations

Equipment Assignment

Proper equipment assignment is important to individual and collective mission success. Does the team leader think he knows all mission requirements or does he really know? Really knowing is a significant challenge. The survey team leader is usually the person who must take the supported unit commander's intent and translate it into technical requirements. For example, a mission may seem to be a perfect application of GPS based on a map reconnaissance; yet once in the field, the line-of-sight gun may be what is needed. The GPS is best-suited for large, open, and unobstructed areas. If there are large concrete buildings or bunkers that block the GPS signal, the gun may be better. Small projects requiring total accuracy are also best-suited to gun usage. The concern about this is balancing whether the unit becomes mission incapable for other missions by sending all equipment to one area against whether a mission can be done with only one. Is there another unit nearby that can help? The United States Army, Air Force, and Navy engineer units can usually help each other if there is advance coordination. Can measurements be taped off and recorded in the field notes instead of using a gun? The mission planner needs to know all resources and methods available to balance current missions against planned missions, as well as any high-priority "short-fuse" missions that may occur.

Mission Creep

Mission creep is how a mission can begin small and become large. Mission creep often occurs when the survey crew thinks they know the mission instead of actually knowing it. Once on-site, the customer usually tries to get additional tasks completed. There is often a mentality of "I have you here now, and I'm going to keep you," because demand is high for in-theater engineer resources, particularly if the client knows that 21Ts have more skills than just surveying. The team leader must know the mission's scope of work, the commander's intent, the unit's full capabilities, the designers and surveyors, and upcoming missions. Typically, a mission directive will give the team one goal and a specific timeline. Often it's good to do extra work within that timeline, because it provides good will and takes care of the supported unit's missions. Other times, the supported unit's "nice-to-have" want would be at the expense of another mission's "must-have" need. The on-site team leader and the unit's operations section must have a firm grasp of the current and projected workload to balance these priorities.

Changes in Focus

Focus changes are a normal occurrence in theater operations. What the unit may think is their mission is what they were trained on or told prior to deployment. What the unit will know is that their mission is what they will encounter in-theater. This happens across all coalition activities, not just engineering, because coalition governments shift priorities, military missions change, the anti-Iraqi forces change tactics, and engineering priorities change. A survey can be top priority one day, and the next day it can be low priority or canceled. Units being told they will be doing a lot of surveys or few surveys based on current or past Operation Iraqi Freedom cycles may find a different reality on the ground. The only solution is to be prepared and remain flexible. Thinking and knowing is measured on a graduated scale, based on the collection of factual data over time. As such, the facts in-theater will change regularly, and what you know to be the mission today may not be the mission tomorrow.

Conclusion

Surveying in a nonpermissive environment is vastly different than in CONUS. The timelines allowed and the safety considerations put the two environments on different ends of the spectrum. The difference between what you think and what you know of the equipment, personnel, principles, standards, environment, and operations is vital to success in-theater. Soldiers of all ranks need to understand this to ensure that all criteria are met and that all Soldiers return. An improper survey resulting in an improper design can mean lives lost. That is a risk that we, as military surveyors, cannot afford. Ensure that your Soldiers know what is necessary and are prepared for it.

Staff Sergeant Johnson is the Construction Management Section NCOIC for Detachment 8, 412th ENCOM, supporting the 130th Engineer Brigade in Iraq. He has been a United States Army technical engineer for 9 years and a civilian surveyor and civil/mechanical designer for 12 years. He has led military survey missions in CONUS, Korea, Germany, Italy, Kosovo, Bosnia, the Marshall Islands, and Iraq, as well as civilian survey teams in six states.

CONTINUOUS KINEMATIC SURVEYING THROUGHOUT IRAQ

By Second Lieutenant Jonathan Wilson

As the military continues to develop its contingency operating bases (COBs) and create improved facilities and living accommodations for its Soldiers, the demand for military surveyors increases. Surveyors in Iraq have a vital role, ensuring that both military and civilian engineer planners have accurate designs and topographic products necessary for planning construction and improvements. The increased demand for surveys requires new technology, equipment, and methods to obtain rapid and accurate results. One piece of equipment in particular, the Trimble® 5700 Global Positioning System (GPS), proved invaluable to the Survey Platoon of the 320th Engineer Company (Topographic), 130th Engineer Brigade, as it conducted numerous missions across Iraq.

Applications

The Trimble 5700 is a versatile piece of equipment that can be used under most surveying conditions. Within Iraq and the scope of military surveying, the most beneficial use was the continuous kinematic collection of survey points. This function fulfills the purpose of developing comprehensive topographic maps at a rate previously unattainable. Throughout the theater of operations, there are

An Army Soldier uses a Trimble 5700 during a survey mission.

> "Over the course of three weeks, the platoon put the Trimble 5700s to the test, collecting more than a quarter million data points in an elaborate grid spanning the area."

little or no detailed contour maps. Although the country is predominately desert, rainfall can average up to 100 centimeters in some areas during the rainy season. The sudden addition of water creates massive flooding in regions that were previously dry. Thus, it has become the focus for many design management sections (DMSs) to plan and develop drainage and flood mitigation plans for their forward operating bases (FOBs) and logistics support areas (LSAs).

In order for a DMS to accomplish the lengthy task of flood control planning and construction design, it first needs a final survey product. The survey product includes a thorough topographic contour map of the surveyed area. The development of a contour map involves a lengthy process of surveying a wide area in a specified grid pattern. Typically, a 50-foot interval is used to create a grid of points from which extrapolations can be made for relief. In the past, this process required one surveyor with an optical total station (a tool used to sense position) to take individual shots as a rod man (raises or lowers the target until the surveyor signals that it is at the proper height) moved from point to point along the set grid. But now, with modern technology and the addition of the Trimble 5700 to the Army surveyors' basic equipment list, all of these tasks can easily be accomplished in a fraction of the time.

Continuous Kinematic Surveying

The Trimble 5700 allows you to select the desired time interval that you want to use. Then, the instrument with its built-in satellite receiver measures a point at that time interval. Essentially, the instrument only needs to be kept at a steady height—on a Soldier's back or attached to a vehicle. The Soldier continually walks or drives the area. If tasked with a site survey, to include drainage for a motor pool or other confined areas, only one Soldier is needed to walk the grid pattern. If the area is larger, a contour map is developed and the instrument is placed on top of the vehicle with magnets. The vehicle then drives the pattern. A 15-second interval is optimal when walking, and when driving, a 5-second interval is optimal as long as the vehicle remains at a slow speed.

Once the surveyors collect all of the raw field data, it is processed. Trimble Terramodel™ is one software program that is compatible with the Trimble 5700. The program takes all of the points, inputs them, and connects all of the points of equal elevation and develops a complete contour map for the DMS to use in its planning and designing.

Put to the Test

All of the beneficial aspects of the Trimble 5700 system were put to use recently by the Survey Platoon of the 320th. As the war evolves in Iraq, many of the smaller FOBs are becoming obsolete, and thus it has become a military endeavor to consolidate its forces into more centralized hubs. The 555th Combat Support Brigade (Maneuver Enhancement) DMS has been charged with the mission of developing all the plans necessary for future Soldiers into COB Speicher. In order for the 555th to complete its mission and correctly make all of the designs for the COB, it first needed to know the existing conditions of the area.

The Survey Platoon began the process of surveying COB Speicher, which was flooded throughout the rainy season. For the 555th personnel to combat and mitigate the flooding, they needed to know the total volume of runoff entering the COB and where all of the water was flowing. They created a detailed contour map of the entire COB, as well as the surrounding watershed, for drainage assessment and planning.

Over the course of three weeks, the platoon put the Trimble 5700s to the test, collecting more than a quarter million data points in an elaborate grid spanning the area. They also extended their survey beyond the perimeter to encompass the surrounding farmlands. With an elaborate grid of points collected—each point a precise coordinate and orthometric (height of a point on the earth's surface) elevation—the platoon compiled and processed all of the data. The result was a comprehensive and thorough topographical contour map of the entire installation with decimeter interval precision.

Mission Success

The Survey Platoon has made efficient and valuable use of the Trimble 5700 survey system throughout the country. With it, the platoon has created comprehensive and thorough maps of several FOBs in less than half the time it would have taken using older methods. The Trimble 5700 is a reliable and beneficial piece of equipment that was used in the collection of more than half a million survey points at a rate previously unmatched by other surveyors.

Second Lieutenant Wilson is the survey platoon leader for the 320th Engineer Company, 130th Engineer Brigade. Throughout Iraq, the platoon has performed numerous surveys to include site, topographic, construction, and hydrologic surveys.

MORE THAN MANAGEMENT

By Major Clarence B. Kemper

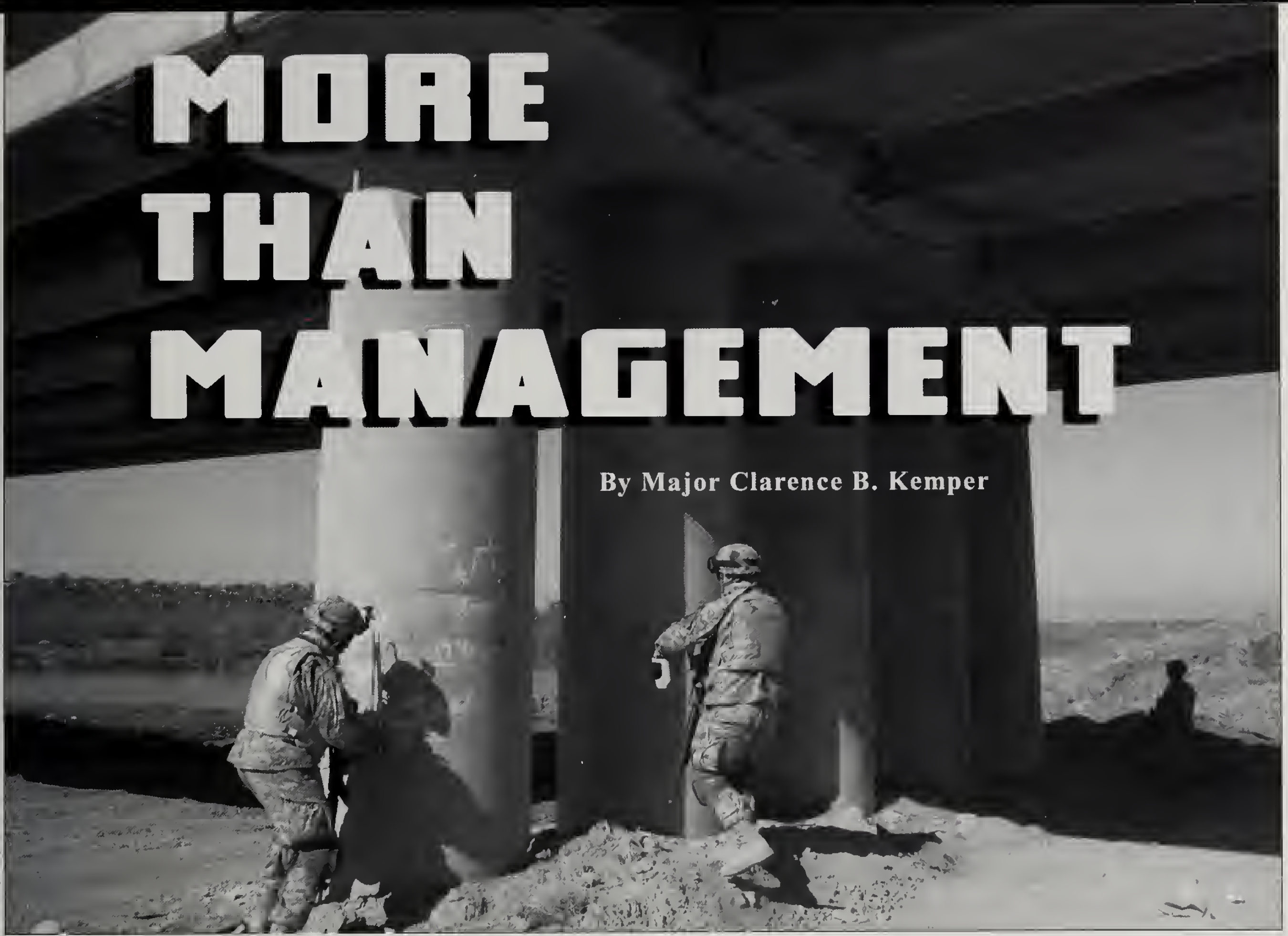


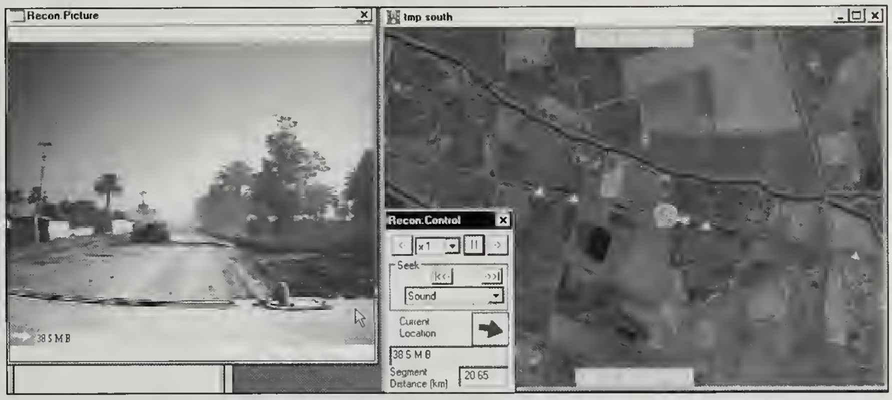
Photo by Major Clarence B. Kemper

Whether you call the collection of military occupational specialty (MOS) 21T engineer technicians and 21D facilities/contract and construction management engineer officers a construction management section (CMS) or a design management section (DMS), the word "management" seems to be the operative word. Usually found in engineer groups and brigades, the CMS and DMS traditionally act as a small engineering firm, providing surveying, design, soils testing, materials testing, and quality assurance/quality control (QA/QC) for construction, materials, and drawings to supported units. When Detachment 8 was formed from the 412th Engineer Command (ENCOM), United States Army Reserves, to support the 130th Engineer Brigade as its CMS or DMS for Operation Iraqi Freedom, it was known that the mission would be more than just management.

The commander of the 130th knew that the brigade would have a wide range of missions. It would be responsible for maintaining and improving contingency operating bases, developing convoy support centers, and overseeing various technical units such as facility engineer teams (FETs), engineer utility detachments, and United States Air Force (Civil Engineer) detachments. These responsibilities would be in addition to the traditional brigade role of providing command and control for combat engineers, construction units, and bridge units and dealing with Iraqi infrastructures. The commander also knew that beyond the traditional role of a CMS or DMS, this kind of organization (from the Reserve Component) offers experienced individuals with real-world engineering experience.

Formation of Detachment 8

The 130th Engineer Brigade is based in Hanau, Germany. The 412th area of responsibility includes the United States European Command and the United States



Current Location
38 S MB
Segment Distance (km) 20 65

The photo above shows output from the USACE Automated Recon Recording Kit, which integrates video capture and voice recordings while storing the vehicle's coordinates and gyroscope data as it travels.

Photo by Major Clarence B. Kemper

A Soldier records measurements during a bridge reconnaissance on the Tigris River.

Pacific Command. While many of the Reserve Component engineer brigades have a CMS or DMS, the Active Army combat engineer brigades no longer have these assets. When the 130th requested technical engineering support for various Iraq-specific missions, the United States Army Forces Command tasked the 412th to provide a team. The result was Detachment 8.

The 412th ENCOM provides command and control for theater engineer operations, with its primary mission being the Eighth United States Army and the Korean Peninsula. However, the unit also has a large number of MOS 21T Soldiers and 21D officers who stay engaged in technical engineering missions throughout the United States, Europe, and Asia, in addition to unit participation in annual joint multinational exercises in Korea. Multiple detachments and individual augmentees have already been mobilized from the 412th to support current operations in Iraq, Afghanistan, Kuwait, the Philippines, and the Balkans. Many of these engineers and technicians have civilian engineering jobs in government or industry, giving them a depth and range of experience not typically available within the Active Army.

The 412th staff capitalized on these individuals, forming a team with a wide range of technical abilities and demonstrated tactical proficiency. Almost all of the officers have engineering degrees and have civilian experience in the civil, mechanical, structural, electrical, environmental, and security engineering fields. The lead surveyor and designer had civilian survey and civil and mechanical design experience, the lead QA/QC individual had many years of commercial materials testing lab experience, and several of the technicians were construction contractors with knowledge of construction and drawings. Several experienced MOS 21H construction engineering supervisors provided additional depth to the team. The detachment commander served with the United States Army Corps of Engineers® (USACE) in the Gulf War as an Active Army engineer officer. Later joining USACE as a civilian civil engineer, he was responsible for USACE projects in South America and has years of engineering experience in areas torn by decades of guerilla warfare. He was also mobilized as a civil engineer for Operation Enduring Freedom in a previous detachment from the 412th and supported operations in northern Iraq and the Balkans.

However, the detachment commander realized that even this pool of talent was not going to be enough to be ready for the missions they would encounter. Many of the Soldiers identified for mobilization were sent to civilian and military training classes, ranging from reclassifying some of the enlisted as 21Ts to add to the technical workforce to training in improvised explosive device (IED) defeat, security engineering, safety, and contracting. Mobilization training at Camp Shelby, Mississippi, included base camp master planning and infrastructure assessment training from USACE, training on modern global positioning system (GPS) survey equipment, and other technical areas including required tactical training.

The 412th Soldiers linked up with the 130th in Kuwait in early October 2005. A few days later, the first teams were sent forward to Iraq to start the missions, and they maintained a rapid pace throughout the entire deployment. The 130th, with the 412th and other subordinate engineer units, assumed nationwide responsibility as the only corps-level engineering brigade.

Command and Control

Command and control was one of the first missions that the 412th started that was not a traditional CMS or DMS function. Since the FETs, the utility detachments, and the Air Force engineers were all working for the 130th, the

Photo by Major Clarence B. Kemper

Periodic technical reconnaissance allows Soldiers to track wear and tear on highways and helps predict future maintenance needs.

130th commander capitalized on the 412th's leadership and expertise to make Detachment 8 the central hub for corps-level technical engineers for the brigade. While Detachment 8 did not have formal command authority over these units, it took on many of the operational aspects of coordination, mission development, and supervision as needed on behalf of the brigade. The command and control assets were critical, particularly with units spread out all over Iraq. When working with these technical units, it was vital to have someone who both understood their world and was experienced in command and control. By "leaning forward in the foxhole," the 412th kept these assets engaged and plugged into future operations planning.

Integration

The 412th provided administrative support, cross-leveled expertise, and was task-organized for specific missions, while augmenting these units with design, engineering, survey, and QA/QC support as needed. The DMS not only developed its own designs but reviewed those for supporting units, providing additional design and engineering upon request. The brigade provided additional staff and resource support. However, for routine operations and technical work, the 412th assumed many of the duties normally falling to the brigade with respect to these units, leaving the brigade to concentrate on the line units and its missions. At the same time, the 412th assisted in intelligence analysis, operations, project tracking, mission development, and other tasks when additional expertise was needed. The detachment became fully integrated into brigade operations, while still maintaining a distinct mission set.

Infrastructure Assessment Missions

Assets were needed for future projects to go out and do the technical reconnaissance and then feed the results back for internal staffing. From that point, the CMS or DMS would develop a solution internally, reach back to USACE for additional support, or conclude that a given problem wasn't an issue that could be addressed at the corps engineer level. This was particularly true for infrastructure assessment missions. Some missions ranged over an extended distance, such as a 400-kilometer reconnaissance for developing estimates and scopes of work for road improvements. Other missions required working with the local Iraqi engineers for troubleshooting water systems and in building projects. Since these infrastructure assessment missions were "outside the wire," tactical proficiency was also required. During their deployment, the 412th found IEDs on job sites, were attacked by anti-Iraqi forces while on convoys and reconnaissance missions, and had mortars or rockets land near their work site or living area. Their ability to respond quickly and go anywhere at any time was cited as a key factor when compared to civilian employees and contractors who had comparable technical skills.

Paving Supply Routes

Some of the missions had been going on for several Operation Iraqi Freedom cycles, such as paving supply routes. These missions had technical, operational, and strategical issues, such as—

- Finding a source for quality paving materials.
- Planning construction around convoy staging requirements and multiple contractors.
- Shifting the availability of funds.
- Working with various Iraq ministries.

Paving supply routes not only affects coalition convoys but also civilian commerce, creating long-term impact on the rebuilding of Iraq.

Water System

The water pipeline from the Tigris River to the Qayyarah West (Q–West) Airfield provides water for many of the local communities. Attacks on the pipeline by anti-Iraqi forces not only interrupted water supplies to Q–West but also to the villages and towns in the region that had less storage capacity and were more vulnerable to a water stoppage. The 130th and the 412th partnered with Q–West units and local leaders to protect the water system as well as to upgrade pumps, relocate taps on the pipeline, and increase overall water production.

(Continued on page 38)

Military Designs:
Design to Time or to Standard?

By Second Lieutenant Carlos Flores

When providing designs in the Operation Iraqi Freedom theater of operations, two options must be considered as the main effort: whether to design to time or design to standard. Both of these options offer the constructing agent significant advantages; one or the other will be chosen, depending on the site and resources available. With increased military operations in Iraq and the reconstruction efforts, United States Army and Air Force civil engineers are faced with incredible logistic and support design challenges. When choosing which type of design will be suitable for a project, consider variables like time, funding, materials available, and human resources, as well as the experience of the troops executing the project. What exactly does *design to time* mean versus *design to standard*? The task of designing in a combat zone to support military operations in an ever-changing war zone requires design flexibility and improvisation. When combined with military operational tempo, this duo presents the battlefield designer with the question at hand: Should I design to time or to standard?

Design to Time

To put it simply, when a construction team designs to time, it presents a 90 percent design solution to the construction unit. The unit must then complete the design, adapting it to the challenges presented at the construction site. In past experience, custom designs have not reached a true sense of professionalism when referring to the end product given to the customer and the construction unit. However, this may not be a negative thing. Custom designs during an operation such as Iraqi Freedom are solutions to an operational need that is identified by a military unit or a customer. To understand the shortfalls of a particular military design, the following must be understood:

- The original intent
- The circumstances surrounding its development
- What the customer actually intends to solve

Designs in Operation Iraqi Freedom are not meant to be another addition to a residential living area or a commercial shopping mall; they are solutions to military operational needs. It is because of the flexibility and competence of American troops that our civil engineering effort in Iraq has made, and continues to make, an impact not only on the quality of life that American troops enjoy during their deployment but also on support to the development and reconstruction effort of a war-torn land.

The experience of the 130th Engineer Brigade's construction section with custom designs in Operation Iraqi Freedom is similar to other units. When a customer identifies a requirement for a project, such as a Southwest Asia (SWA) hut or a simple wall renovation, the designing unit provides guidance to the customer on what can be built based on the restrictions in the area. Sometimes, a customer wants special features in a project that will increase the difficulty of the construction project; however, through deliberate yet brief analysis, the designing unit can help guide the customer in making a better decision regarding the recommended design. The process of making a custom design begins when a unit is officially tasked to design a project—the equivalent of a civilian firm getting a contract. Each construction team must take into consideration that there won't be as many design options, meaning

Army engineers construct a road to facilitate access to a logisitics support area.

that there are fewer design teams deployed than there are civilian firms to choose from back in the United States.

One characteristic about custom designs in the Operation Iraqi Freedom area of operations is that it will likely continue to change until the project is completed. A design team is often pressed for time when a new design is started. This time constraint, although not unusual among military operations, isn't common in the civilian world. In many instances, the need for expedited results is addressed because of a serious short-fall that does not allow a unit to perform tasks that greatly affect their security or the well-being of Soldiers. Therefore, designs in Operation Iraqi Freedom have not evolved into a consummate set of construction drawings, but into a solution that, in many cases, results in a 70 percent solution.

A SWA hut nears completion.

Time and money have much to do with the degree of complexity of a design. For example, between the rainy months of January and March, flooding is a very serious issue for many installations and Army units in Iraq. Issues such as mobility and health are highly important in order to maintain combat readiness. Can a design team provide a full survey and go through the never-ending steps of proper design? The answer is no. A quick solution must be presented to preserve what little comfort and life support Soldiers have inside their living areas, since there is no other place for them to go to in Iraq.

Design teams from the Air Force and the Army have been challenged to bring these kinds of solutions to the battlefield. Sometimes personnel and equipment are not available, but through creative thinking, multiple obstacles are breached every day by civil engineering design teams in Iraq. Army engineers from the 84th Engineer Battalion constructed a road to provide access to a logistics support area so Iraqis could bring business and materials. The project is a good example of a quick solution, because it took only two and a half weeks from the time it was identified as a projected need to the time it was completed. The design work was much faster than normal and was complemented by sound engineering efforts during construction. If time had been a concern, the construction team would have been better off using a standard design.

Design to Standard

Standard designs are an effective way to provide almost instantaneous design solutions. However, designing to standard is very rare in Operation Iraqi Freedom because of the constraints and given the nature of the mission. Standard designs, although a quick way to get a design out to the customer, present other challenges, to include preparing the site to accommodate a standard design. While a design can be called standard, it will never be truly standard when constructed, because each site is different and presents challenges of its own. In order for a standard design to work properly, there must be communication between the design team and the builder. Additionally, the builder must be able to see implied tasks that come with the union of a standard design at a nonstandard site. In fact, many times the design has to evolve to fit into the site.

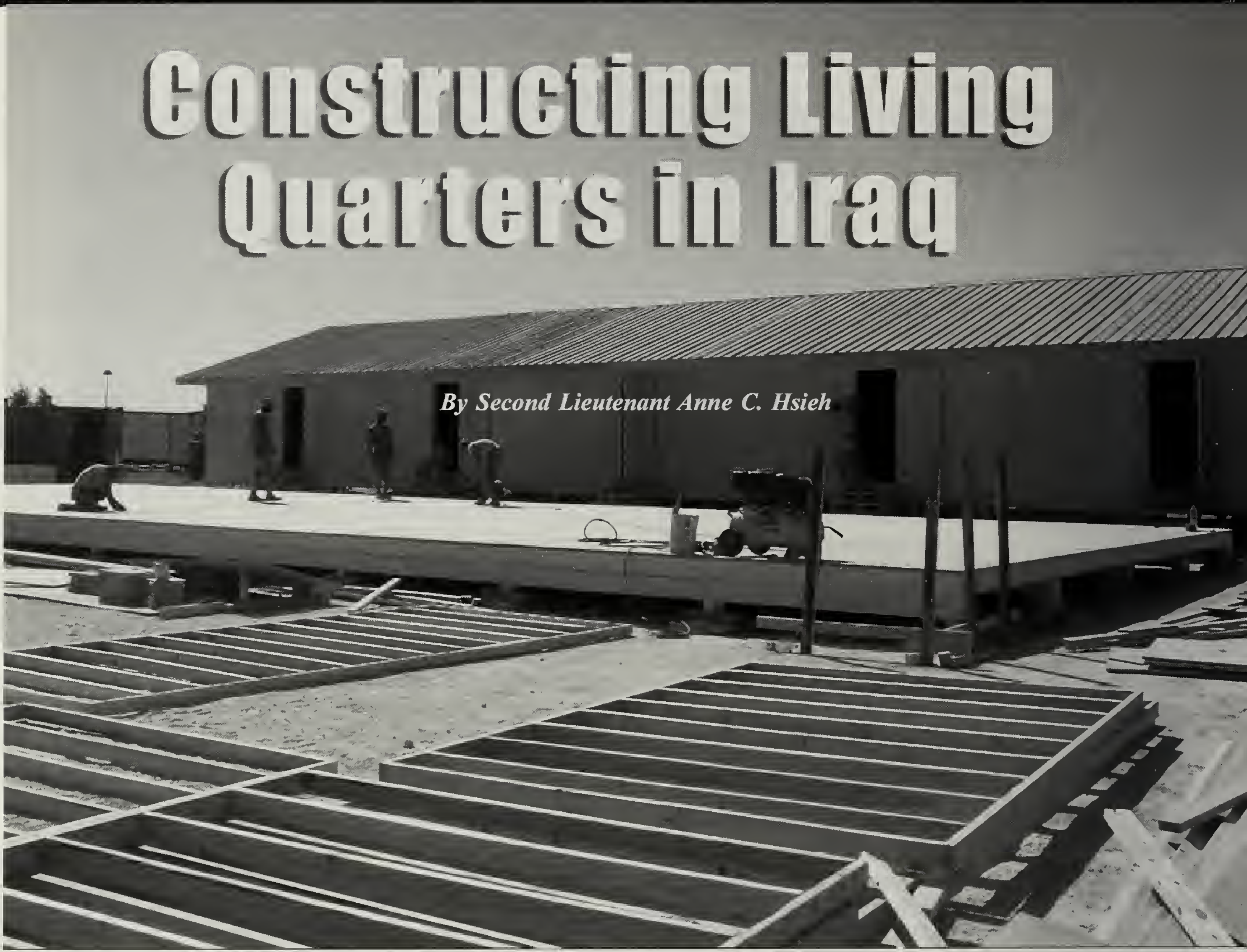
A good noncommissioned officer in charge (NCOIC) of construction is essential for executing a standard design. Although a standard design means faster design time, it could involve complications. But Soldiers and Airmen overcome these complications through communication and hard work.

Conclusion

Given an expedient design, U.S. Soldiers have had to improvise as they build. Design is not a simple task in Operation Iraqi Freedom; it requires a design team that is flexible, willing to commit, and able to overcome obstacles. Army units are constantly faced with challenges in Iraq; however, through the great work of engineering units and construction elements, they have achieved success in presenting a design solution that meets the needs of both the military and the civilians.

Second Lieutenant Flores is the S-3 assistant construction officer for the Multinational Corps–Iraq, 130th Engineer Brigade. His previous experience includes project manager in several engineering firms in the United States, design manager, chief designer in 52 architectural projects, and studio design instructor.

Constructing Living Quarters in Iraq



By Second Lieutenant Anne C. Hsieh

As the Multinational Corps–Iraq (MNC–I) continues to turn over military control to the Iraqis, small forward operating bases (FOBs) and combat outposts all over the country are shutting down and consolidating at a few main FOBs, one of which happens to be Al Asad Air Base. As a result, Al Asad needs to grow and develop to support the influx of personnel and units on base.

Soldiers from Alpha Company, 84th Engineer Battalion (Combat), worked on construction projects all over the base. Most recently, 1st Platoon was assigned to build living facilities called Southwest Asia (SWA) huts—based on the Southeast Asia (SEA) huts originally developed in Vietnam—for incoming personnel. From the start of the project in mid-April, the platoon met with a variety of challenges characteristic of any construction project in-theater: poor quality of materials, resource constraints, equipment breakdowns, and changes in plans. In addition, other missions sometimes took priority, pulling all personnel away from the project for weeks at a time. Nevertheless, the platoon has still managed to remain flexible and complete the project to standard. The platoon adapted to new issues as they arose, working late to compensate.

Prior to this project, 1st Platoon—also known as the "Rough Riders"—spent three months building the Iraqi army camp at Combat Outpost Rawah. Working with Navy construction battalions (Seabees), the platoon finished the project four weeks ahead of schedule. Upon its return to Al Asad, the platoon was assigned to various construction missions across post. The platoon transitioned away from the Navy Seabee construction system under which it had learned and worked during the first three months of deployment. Through the Al Asad project, the platoon discovered and refined the various strengths of its members and became a more cohesive unit.

More than 25 percent of the platoon is composed of combat engineers, most of whom never worked on construction projects before the deployment, much less directed construction crews. Their incorporation into the unit and performance in carpentry and electrical work was phenomenal. The platoon's combat engineers were given more construction responsibility at Al Asad, as opposed to the first project in Rawah, where they were an asset in tactics and force protection measures, and carpenters provided the technical skill and knowledge on the construction site. Combat engineer sergeants in the platoon even served as construction squad

Opposite page: The frame of an exterior wall of a SWA hut awaits completion of the floor.

Top: Soldiers from 1st Platoon work together to sheath the floor of a SWA hut.

Lower left: The completed SWA huts will provide comfortable living quarters for personnel at Al Asad Air Base, Iraq.

leaders for weeks at a time, manning their squads and leading by example on the jobsite every day. For the most recent living area construction project, two combat engineers directed and emplaced the entire roofing system for several of the large buildings. The experience of "carpenters and combat engineers joining forces" has been a challenging and worthwhile one. They learned to work together as one engineer unit despite different backgrounds.

They were indeed an incredible team. Even when there was only a few months left of deployment and dozens of construction missions looming on the horizon, the Soldiers of 1st Platoon, Alpha Company, 84th Engineer Battalion, continued to make a difference at Al Asad and Iraq—one SWA hut at a time.

Second Lieutenant Hsieh is the vertical construction platoon leader for 1st Platoon, Alpha Company, 84th Engineer Battalion (Combat). She is currently stationed at Al Asad Air Base, Iraq. She graduated from the United States Military Academy at West Point in 2005 with a double major in comparative politics and arts, philosophy, and literature.

RESOURCING THE MASTER PLAN:

THE 130TH ENGINEER BRIGADE CLASS IV STORY

By Captain Jeffrey M. Swartzlander

Engineers in Iraq have a huge job to do. One of the primary missions of the 130th Engineer Brigade was to support enduring base camp development and ensure that long-term bases grow and expand to accommodate the closure of dozens of small base camps throughout the country. As small operating bases close or are transferred to Iraqi army control, displaced coalition personnel and equipment move to an enduring base camp. In order to support all the construction driven by the base camp closure process or other support needs, Multinational Corps–Iraq (MNC–I) directed the 130th to maintain stocks of Class IV materials to support internal projects. The yard demands a great deal of effort to manage and maintain. However, nothing was quite as rewarding for the 130th S-4 section as running a thriving Class IV yard. This article outlines many of the tips, tricks, and systems that helped the yard flourish. Hopefully, some of the ideas presented will be useful to other engineers in-theater and to engineers who may have a similar responsibility one day.

The yard was only about seven months old when the 30th Engineer Brigade transferred authority to the 130th. During that period, the 30th S-4 section had built a very large and successfully operating Class IV yard. Millions of dollars spent during those seven months enabled four construction battalions to continuously build throughout Iraq, as well as advance unit basic load (UBL) stockage levels for the yard. When the 130th assumed control, its first priority was to continue developing internal and external systems and procedures where its predecessors left off.

Understanding the Process

To run a large Class IV yard, several systems must first be understood. Using the Joint Acquisition Review Board (JARB) and Joint Facilities Utilization Board (JFUB) processes, spend plans, purchase requests, contracting system, and military standard requisitioning and issue procedures (MILSTRIP) keep the yard stocked despite large and continuous outputs. An overview of these systems looks like this:

- *JARB:* An MNC–I board validates unit funding requirements costing more than $200,000. The 130th had an approved JARB packet that allowed funding requests to be forecasted on the spend plan, specifically to build and maintain a class IV basic load.
- *JFUB:* An MNC–I board validates and makes an approval recommendation for construction projects costing more

A pole barn—designed and built by the 130th Engineer Brigade—protects stocks of lumber, plywood, and cement from the elements.

than $200,000. Area support groups or major subordinate commands must secure the board's approval prior to securing project funding and commencing work on the project.

- *Spend Plan:* Units forecast and request all of their nonstock funding needs on a monthly financial report. Large requests (more than $200,000) must be previously validated by the JARB or JFUB.
- *Purchase Request:* The Department of the Army (DA) Form 3953, *Purchase Request and Commitment*, moves funding that was already forecasted and approved on the unit spend plan from resource management to the local contracting office.
- *Contracting:* A contracting officer uses funding committed on a purchase request to purchase supplies or services directly from a commercial source. For Class IV, this source is typically a local Iraqi company. Contracting is currently the major ordering method for ready-mix concrete and aggregate; electrical, plumbing, and hardware items; and any other commercially available products not readily available through MILSTRIP.
- *MILSTRIP:* This is the standard Army requisition system—separate from the above funding and contracting processes. Units requisition supplies through the Unit Level Logistics System (ULLS) or the forward distribution point (FDP) using a national stock number (NSN). MILSTRIP is the preferred and easiest procurement method. The 130th used this as the primary source for lumber and other types of construction materials.

Resourcing

Although the 130th operated and maintained a Class IV yard in support of brigade construction missions, the S-4 section didn't resource all projects due to limited personnel and resources. Guidelines were established for customer units that requested Class IV. Customers were normally expected to resource their own materials for projects, or at a minimum, obtain corps approval and funding for anything but minor projects. When possible, the 130th sourced the bill of materials (BOM) for projects from on-hand stock rather than delay a project for two or more months while the customer ordered the materials. The customer unit then furnished the 130th with the funded purchase request, and the 130th used the customer unit's funding to reorder and replenish the materials. In short, they sourced standard projects immediately with on-hand materials and replenished the depleted materials with future funding.

Obviously, only materials stocked in the yard could be provided. The customer is expected to source any nonstandard or accountable items for projects. Our S-4 section was not intended to be a substitute for other S-4s or relieve them of the responsibility of resourcing their units' needs.

When one of the 130th subordinate units was assigned a construction project, the constructing unit received a BOM from the design section of the 412th Engineer Command. Our construction unit completed a Class IV request router and submited it with the BOM to the brigade S-3 construction officer. The project was validated and assigned a mission tracking number. The router and BOM were staffed through the brigade S-4 delegate, and from there the BOM went to the Class IV noncommissioned officer in charge to prepare the materials for pickup. Once the materials were picked up, the BOM and request router were filed for material accountability. No materials left the yard without being accounted for.

Improving the Process

Improving routine ordering, which resulted in improved yard maintenance and control, was probably one of the largest contributions the 130th made to the operation of the Class IV yard. The brigade property book officer established a derivative unit identification code (UIC) and Department of Defense activity address code (DODAAC) strictly for Class IV yard use. Our ordering sergeant was able to place MILSTRIP requisitions at the FDP for expendable Class IV materials. The ordering sergeant also coordinated with the headquarters company ULLS–Ground clerk to order construction materials using the Class IX DODAAC. By continuing to research product NSNs and working the supply system, the yard was increasingly self-supportive and less dependent on competitive nonstock funds.

With regard to contracted orders, several hundred line items are available for order through easy-to-use blanket purchase agreements (BPAs) at the local contracting office. The BPAs enabled the S-4 ordering officer to place Class IV orders directly with vendors and simply maintain the declining funds balance. Quantities ordered were derived from a UBL shortage report from a computer database and an analysis of demand history.

Facing Challenges

One continued challenge is long and often unpredictable lead times in ordering supplies, with delivery of contracted orders arriving anywhere from one week to two months after the order was submitted. The same holds true for MILSTRIP orders—delivery from a matter of days to several months. Another common problem is material variants delivered by Iraqi vendors. Despite item photographs, illustrations, and descriptions in the contract, local vendors all too often provide incompatible, unwanted materials that must be returned. To mitigate this problem as much as possible, the S-4 ordering officer must be very clear and coordinate fully with the contracting officer and the vendor to ensure that the proper items are ordered and delivered. A final challenge to highlight is managing customer expectations. The yard principally exists to source brigade construction projects, while also serving as a reserve stockage for corps "be prepared" missions. As a general rule, the 130th did not source self-help projects on post, which can usually be resourced by the area support group's Directorate of Public Works self-help yard. Or the unit may order materials through the same MILSTRIP or contracting processes that the 130th used to order materials. The 130th resourced an outside unit if there was a legitimate need, if the project was validated and approved by the brigade

S-3 construction officer, and if the yard had sufficient materials on hand.

Conclusion

The Class IV yard came a long way since the 130th Engineer Brigade assumed control. It effectively and efficiently developed, managed, and improved the yard to proudly hand off to the next engineer brigade. The 130th Class IV yard truly "made a difference" in Iraq!

Captain Swartzlander is the S-4 in the 130th Engineer Brigade. His past assignments include survey platoon leader for the 320th Engineer Company (Topographic), executive officer for the 502d Engineer Company (MRB), and S-4 for the 565th Engineer Battalion. He is a graduate of the United States Military Academy.

Providing Class IV Support to the Iraqi Army

By Captain Jeffrey M. Swartzlander

Soldiers of the 130th Engineer Brigade contributed to the construction of a new Iraqi army base camp in Northern Iraq by issuing critical force protection materials to the Iraqi 1st Motorized Transportation Regiment (MTR). These high-priority materials were used to supplement force protection measures of the camp. Though this load-up was small, the brigade looked forward to future opportunities to assist the increasingly self-reliant Iraqi security forces.

For the past several months the Iraqi military forces have played an increasing role in maneuver operations to defeat terrorism. However, this transport mission executed by the Iraqi 1st MTR illustrated that the Iraqi army is becoming increasingly proficient at running its own logistical operations in addition to tactical operations. Although the convoy commander for this mission was an Army captain, it is only a matter of time before the Iraqi army is running its support and sustainment convoys autonomously.

The 130th maintained construction and barrier materials on-hand in its Class IV yard to supply theater construction projects. From on-hand materials, the 130th issued required supplies in a short time, allowing projects and mission construction or force protection missions to begin without delay.

Even though the convoy arrived a little behind schedule, the long-awaited force protection materials needed for the new Iraq forward operating base (FOB) were ready for issue. The 130th worked hand in hand with the Iraqi army, which shows a lot of dedication and enthusiasm as it continually moves closer to full self-reliance.

Captain Swartzlander is the S-4 in the 130th Engineer Brigade. His past assignments include survey platoon leader for the 320th Engineer Company (Topographic), executive officer for the 502d Engineer Company (MRB), and S-4 for the 565th Engineer Battalion. He is a graduate of the United States Military Academy.

("More Than Management,"continued from page 31)

Similar civil-military missions included the evaluation of water treatment plants, sewage treatment plants, and buildings for local schools, often with subsequent design or other engineering support to improve those facilities.

Environmental Surveys

Environmental surveys are requirements for closing down any U.S. facility in Iraq, but there were no environmental survey teams available. This became critical to the corps-level mission of drawing down the coalition basing footprint. Under the leadership of a lieutenant colonel who is an environmental engineer with USACE as a civilian, several teams were trained in environmental standards, sampling equipment, and personal protective equipment. Through their efforts, a series of bases and facilities (including the Abu Ghraib prison) were closed or handed over to the Iraqis in a timely manner.

Quality Assurance/Quality Control

Alongside all of these other missions was the traditional CMS or DMS role of providing in-house design and managing troop construction. Designs included multistory, wooden buildings; concrete guard towers; building renovations; and roads and runways. Structural, civil, mechanical, electrical, environmental, and security engineering were integrated to create complete design-build packages for other units or contractors to execute. The QA/QC section worked with local concrete batch plants to improve the quality and consistency of the concrete by sharing expertise and conducting regular testing to ensure that the specifications were met. The QA/QC section also worked with units and contractors to ensure conformity of the plans and specifications or to work out variances, if required. Survey teams were sent out all over Iraq on missions that included performing 1,000-acre surveys and spot surveys to ensuring that new equipment was properly set and integrated into existing systems.

Conclusion

The 130th Engineer Brigade could not have accomplished these missions without Detachment 8, 412th ENCOM. Through its leadership and technical expertise—ranging from proactively assessing possible future projects (on and off post), supervising and assisting the FETs, and working with engineers of all services—Detachment 8 was a true force multiplier for the brigade and accomplished much more than just management.

Major Kemper is the structural, mechanical, and force protection engineer for Detachment 8. Commissioned in the United States Army Reserves, he has commanded a combat support equipment company and a mechanized combat engineer company. Since joining the 412th ENCOM in 2003, he has served in Germany, Italy, Korea, Vietnam, and Thailand. He is a registered professional engineer in Louisiana, Texas, and South Carolina and holds a mechanical engineering degree from Louisiana State University. In civilian life, he is a consulting engineer.

Winning Logistical Battles Together:

Civilian and Logistical Support in Operation Iraqi Freedom

By Captain Caprice Vargas

These days, civilians are not just on the battlefield; they are shaping it and contributing to the fight. In the maintenance and logistics world, the Army is relying heavily on contracted civilian support so it can focus more on the mission. This is great for the Soldier on the ground.

The 130th Engineer Brigade Maintenance Office was responsible for coordinating and communicating with these outside civilian agencies. If a unit is deploying to Iraq, especially as a part of a higher headquarters engineer element, the unit should prepare and train its Soldiers for the presence of these civilians on the battlefield. It is a lot like the civilian business world—the unit will have to make contacts, watch for upcoming fieldings and projects and, most of all, have a good rapport with the civilians.

Civilians on the Battlefield

On a daily basis, the 130th worked with civilian contractors employed by KBR, Inc. (formerly Kellogg, Brown, & Root); ManTech International Corporation; Caterpillar®; American Defense Systems, Inc. (ADSI); and L-3 Communications, as well as Department of the Army (DA) civilians.

KBR

KBR provides everything from maintenance support to transportation of parts and equipment. In addition to having military service units operate maintenance support shops, the Army hires contractors to enhance the capabilities of the units.

In-theater, KBR contractors perform the duties of the supply support activity (SSA) and the direct support shop, under the guidance and direction of the assigned Army unit. Because they don't have a rank structure, there are slight differences in management, but the equipment is fixed and the parts are supplied nonetheless.

ManTech

ManTech supports many different types of equipment. The maintenance shop frequently interacts with this agency, attending meetings with ManTech contractors and project managers. ManTech works for the Product Manager, Assured Mobility Systems; together, the Army and ManTech have improved route clearance equipment. Although the ManTech shop isn't run like a military maintenance shop, similarities do exist, such as using a DA Form 5988-E, *Equipment Maintenance and Inspection Worksheet*, to open a job order.

A grader receives additional armor.

An up-armored D7 dozer is tested.

Caterpillar

Caterpillar handles many pieces of special engineer equipment that is not logistically supported by the Army system. A lot of engineer equipment is difficult to maintain, and parts are hard to acquire. So the maintenance shop relies on Caterpillar to provide mechanics for upper-level maintenance and parts. A blanket purchase agreement is used to buy parts for equipment such as dozers, scrapers, and graders that are hard to acquire. Once the parts arrive from the Caterpillar delivery system, their mechanics also install them. This operation is run similarly to ManTech.

ADSI and L-3 Communications

At Logistics Support Area (LSA) Anaconda, ADSI and L-3 Communications have made a joint effort to support engineers with special missions and special equipment needs. The Combat Engineer/Material Handling Equipment, Product Manager, hired ADSI. Civilians are in charge of the shop, and it runs well.

Parts Acquisition

The parts acquisition for the brigade is a huge challenge. Many civilians helped the 130th with parts acquisition and tracking. The DA civilians at the United States Army Tank-automotive and Armaments Command (TACOM) and the Defense Logistics Agency (DLA) help track down parts through the Army system. Parts managers from Caterpillar and the AutoMAK General Trading and Contracting Company help acquire critical parts for engineer equipment, including older equipment that is relevant to the mission but being phased out or replaced. These parts are generally shipped using civilian methods until they arrive in-theater, and then it becomes the unit's responsibility to transport the part on location.

Conclusion

Civilian and military personnel all have different missions in the Operation Iraqi Freedom theater. Without these agencies, vulnerabilities that could injure or kill Soldiers in action would exist. Our goal is one and the same: Win the war and keep our Soldiers safe.

Captain Vargas is the brigade maintenance officer for the 130th Engineer Brigade. Previous assignments include production platoon leader, 320th Engineer Company (Topographic); executive officer, Headquarters and Headquarters Detachment, 565th Engineer Battalion; and executive officer, Headquarters and Headquarters Company, 130th Engineer Brigade. She holds a degree from Illinois State University.

Photo by Staff Sergeant James Morris

Careful Planning Makes Safe and Rewarding Civil Affairs Missions

By Captain Brian J. Henderson

Any mission outside the confines of a forward operating base or logistics support area (LSA) has its hazards. Humanitarian and civil affairs missions are no exception. This was experienced when "Pioneer" Soldiers from Headquarters and Headquarters Company, 130th Engineer Brigade, had a mission to conduct an inspection of a small school near LSA Anaconda, Iraq, to determine the feasibility of making improvements.

The noncommissioned officer in charge (NCOIC) of the brigade commander's combat security team coordinated the mission. He wanted to make sure they planned for every contingency. He used aerial photography and current intelligence information to prepare his plan. Considerations included site security, rally points, partisan linkup, and battle drills for enemy contact such as improvised explosive devices (IEDs) or sniper fire.

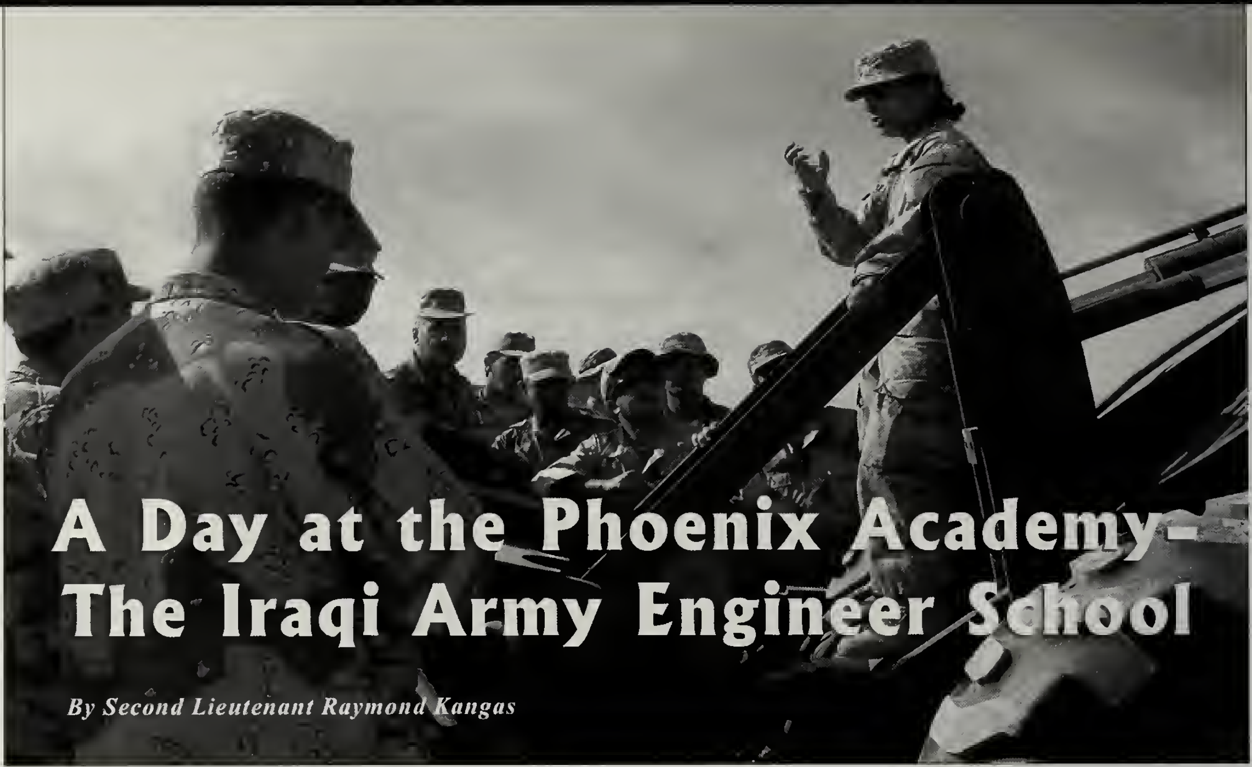
Meanwhile, the team conducted classes on using the M2 machine gun and rehearsed casualty evacuation (CASEVAC) procedures. Even though this was a humanitarian and civil affairs mission, the team needed to be prepared for emergencies. While the team members were highly trained in their battle drills, many of them from different military occupational specialties had not made it "outside the wire" yet. With a detailed operation order, rock drills, and rehearsals, all of the Soldiers involved felt confident in their mission.

When the team members arrived at the school that morning, they performed their battle drills flawlessly. Once their vehicles were in the designated sectors of fire to secure the site, the translator and the company commander linked up with the school headmaster. At this point, the Soldiers were able to dismount and greet the gathering crowd of children.

When the team inspected the school building, it discovered that there was no electricity or water. The headmaster expressed his interest in expanding the school and getting a reliable source of electricity. He said that the school's population would continue to grow and that the facility was needed for teaching all of the children.

When the inspection was completed, the Soldiers moved on to the humanitarian part of the mission. The children were given school supplies, toys, shoes, and food. Many of the gifts were collected from packages received by the Soldiers from friends and families back home. Additional gifts were provided by the 3d Corps Support Command (COSCOM), Assistant Chief of Staff, Civil Affairs (G-5) staff. The looks on the faces of the children made all of the preparation worthwhile. This mission was one more step toward the rebuilding of Iraq.

Captain Henderson is the commander of Headquarters and Headquarters Company, 130th Engineer Brigade. His previous assignments include S-3, 130th Engineer Brigade, Hanau, Germany. He is a graduate of the Airborne School, Engineer Captain's Career Course, Combined Arms Services and Staff School, Ranger School, and the North Atlantic Treaty Organization (NATO) Officers Course. He holds a bachelor's in environmental engineering from North Carolina State University.



A Day at the Phoenix Academy—The Iraqi Army Engineer School

By Second Lieutenant Raymond Kangas

One of the most rewarding experiences for a Soldier deployed to Iraq is to see the Iraqi people rebuilding their country and improving their way of life. On 1 April 2006, the Equipment Platoon, Headquarters and Support Company, 84th Engineer Battalion (Combat) (Heavy), had the unique opportunity to impact both of these goals by instructing Iraqi engineers on the operation of heavy engineer equipment. At the end of the day, the Americans and the Iraqis had learned a valuable lesson in engineering and team building.

Engineer forces are critical to the country of Iraq. As the Iraqi force grows and trains, it will acquire more responsibility for the reconstruction of its country's infrastructure and force protection measures and the basic mobility, countermobility, and survivability of combat engineer forces. The Iraqi engineers have built their fleet of equipment from various coalition forces. Now, the challenge is to train them on this equipment.

The Iraqi army has an excellent engineer training area located near Baghdad. With plenty of open space, scrap yards, and abandoned buildings, the Phoenix Academy at Camp Taji is the perfect setting for heavy engineer equipment training. The academy—also known as the Iraqi Army Engineer School—will grow and develop as a site for future Iraqi engineer soldiers to hone their operating skills. After graduating from the academy, the Iraqi engineers are assigned to their units to continue training and integrating with other military branches, develop their infrastructure, and create viable engineer units in the field.

The Equipment Platoon Soldiers helped the Iraqi army move closer to its goal by providing expert instruction on the engineer equipment. The platoon leader selected five noncommissioned officers, which included a staff sergeant with years of experience as a D7 dozer instructor at the United States Army Engineer School, Fort Leonard Wood, Missouri. For the one-day training session, each instructor prepared a 45-minute block of instruction covering the basic components, operating procedures, and operator maintenance of the D7 dozer, the 5-yard bucket loader, and the M917 20-ton dump truck.

During the morning session, the instructors watched as the Phoenix Academy cadre held formation and marched their soldiers to the training area. The Iraqis rotated to different pieces of equipment and listened as the instructors taught them the basics of each engineer asset. Interpreters were on-site to assist with communication. This verbal instruction period gave the Iraqis a chance to ask questions and receive an overview of the equipment's operation and capabilities.

During the afternoon session, the instructors organized "hands-on" instruction so that each student had an opportunity to operate the equipment. The instructors rode alongside the Iraqi soldiers as they operated the equipment for the first time. This enabled the instructors to point out techniques and capabilities of the machinery that was hard to communicate during the morning session. The American and Iraqi cadre conversed and took notice of the sense of accomplishment their soldiers displayed. It was evident they were excited to receive the equipment and instruction and step closer to their goal of self-sustainability.

The Equipment Platoon not only successfully completed its mission to train the Iraqi engineers but also walked away with a better understanding of what a great challenge it is to rebuild a country. The experience was a cultural exchange between nations rather than merely a block of instruction. The Equipment Platoon's experience and interaction at the Phoenix Academy created a more solidified engineer team between the 84th Engineer Battalion and the future Iraqi engineer force.

Second Lieutenant Kangas is the heavy equipment platoon leader for Headquarters and Support Company, 84th Engineer Battalion. He holds a bachelor's in business from Kennesaw State University in Atlanta, Georgia.

130th Engineer Brigade: HOT and MAD in Iraq

Photo by Jimmy Lane Jr.

By First Lieutenant Sarah E. McMahon

The 130th Engineer Brigade was HOT (*Helping Our Troops*) and MAD (*Making a Difference*) in Iraq. During Operation Iraqi Freedom (OIF) 05-07, members of the 130th cleared improvised explosive devices (IEDs), filled potholes, provided electrical power, and built living quarters across the Iraqi province. As the brigade commander said from the beginning, "*Make the days count, don't count the days.*" The brigade's deployment to Iraq has now ended, but everyone worked hard to make sure that the efforts and time put in would leave a mark that would last until long after American forces are home.

Working on the 130th Engineer Brigade staff opened the eyes of this junior officer. At a platoon, company, or even battalion level, the big picture can often be overlooked. But after working on the theater corps engineer brigade staff, a whole new world was brought to light about all the great things Soldiers everywhere are doing in Iraq. The main focus of OIF 05-07 was on rebuilding and transitioning power to the Iraqis, a piece of the puzzle that the 130th played a large part in. Members of the 46th Engineer Battalion, the 913th Combat Support Equipment Company, the 412th Engineer Command, and the 84th Engineer Battalion worked diligently through the blazing heat to rebuild their areas of operation. Whether it was repairing roads, opening river crossings, or building living quarters to improve quality of life, these units were the key to success for all missions.

Not to be outdone, the 54th Engineer Battalion and the 110th Engineer Battalion spent their days in Iraq making the roads safe for military convoys and civilians alike by clearing IEDs—one of the deadliest hazards of the war. Each day, those Soldiers put their lives on the line for the mission and wouldn't quit until their time in country was done. Put in situations that would make most people shy away, these Soldiers boldly took on their mission and raised the bar of excellence for future operations in their field.

OIF 05-07 had its hardships, because many of the battalions experienced loss. Soldiers were wounded and left the theater to return home, and others paid the ultimate sacrifice for their country. It is the memories of those brothers and sisters the brigade lost that drove the remaining Soldiers to strive harder for excellence and never let up, honoring the memory of their fallen comrades. It is never easy to say goodbye, but their sacrifices will not be in vain.

Overall, the brigade's time in Iraq was a huge success, and the Soldiers went home holding their heads high—proud of what they accomplished. Whether working on a brigade staff or working as part of a team in a platoon, each Soldier played an important role in the success of the 130th Engineer Brigade during OIF 05-07. The articles on the preceding pages (4 – 42) tell their stories and the part they played in the reconstruction of Iraq and the Global War on Terrorism.

First Lieutenant McMahon was the Assistant S-1 of the 130th Engineer Brigade. Her previous assignment was as Headquarters Platoon Leader of the 320th Engineer Company (Topographic). She holds a degree from the University of Notre Dame.

Brigade Special Troops Battalions

Part I: All the Way In

By Lieutenant Colonel Thomas H. Magness

Consider the case of the brigade special troops battalion (BSTB). There is no approved doctrine and no distinct approach to growing a leader for its ranks. No single branch currently owns it nor populates its leadership roles. Across the Army, it is considered a collection of "specialists" with no clear task and purpose—a battalion in search of a mission and a meaningful role within the brigade combat team (BCT). Few understand it. Fewer still have seen what happens when you unlock the vast potential that resides within the assemblage of this seemingly unrelated group of maneuver supporters.

Simply put…you must be "all the way in." To really "get" the BSTB, you must fully embrace transformation and the new paradigms associated with the Army redesign. You cannot just dip your little toe in the water—you have to take off the harnesses, shed completely the old way of doing business, and fully immerse in the transformation "pool." Doing so reveals this battalion as a truly powerful enabler of maneuver, *synchronizing* and *synergizing* effects across the brigade's area of operations (AO), and *delivering* for its respective BCT in ways that are orders of magnitude greater than what was possible without it. More importantly, the BSTB is a battle-tested battalion that exists to address some of our most challenging combat missions, to include execution of intelligence and communications functions, assured mobility, reconstruction and essential services project management, and military police operations. It is a battalion whose success is directly linked to the success of its supported brigade. It is a battalion whose every leader and every Soldier had better, themselves, be all the way in.

What follows, then, is a collection of findings and observations that describe what "all the way in" might look like. It is a combination of lessons learned at the National Training Center and regular dialogue with BSTB commanders and leaders in various stages of the deployment cycle. This article reflects the growing body of knowledge and understanding about the capability of this powerful organization and the new operational paradigm that must exist to fully leverage it. Finally, I believe it reflects the vision of our Army leadership in creating modular, capabilities-based units that are able to fight and win on a full-spectrum battlefield. But to understand this vision…you *must* be all the way in!

Background

The decision to create a new BSTB was made after several…observations of the newly fielded Stryker brigade combat team (SBCT) revealed a need to bring the many separate, enabling combat support units under the control of one commander. The span of control in the SBCT organizational design proved to be too extensive for effective C2 [command and control]of these many enabling eaches. The BSTB organizational design allows the BCT commander…to concentrate [his] focus on the battle in all threat environments, without the added direct responsibilities that these small units require.[1]

The Army recognized a challenge in its modular design with respect to the command and control of small (company and below) maneuver support units. The brigade commander needs to focus on fighting his respective battalions. The brigade staff identifies subordinate unit tasks, the completion of which will enable the accomplishment of the commander's intent, while synchronizing and resourcing subordinate battalions for success. A brigade commander and his staff simply are not resourced—and frankly do not have the time or energy—to command and control, let alone resource, prepare, train, or provide administrative oversight to these disparate units, dozens of which may be present within a deployed BCT formation.

The nearly 40 BSTBs in the Army exist to help solve this problem. BSTBs *command* and *control* attached and organic units—period. They execute the tasks assigned to them. They leverage the full "team of teams" to accomplish the mission according to the BCT commander's intent. They receive the tasks assigned to them by the brigade, translate the tasks into synchronized mission orders, and complete them in a way that adds value to the brigade.

What kind of missions? Generally the BSTB executes missions that extend across the BCT AO. These are missions that exceed the geographic boundaries of a maneuver task force and for which oversight and command and control responsibilities reside at the brigade level (i.e., the BSTB). These missions might include intelligence and communication operations, route reconnaissance and clearance, civil affairs missions, or essential services management—the execution of which generally requires the crossing of task force boundaries and often reaches across the full width and depth of the BCT AO.

> *Command*: The authority and responsibility for effectively using available resources for planning the employment of, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions.
>
> *Control*: The regulation of forces and other battlefield operating systems to accomplish the mission in accordance with the commander's intent.
>
> FM 1-02, *Operational Terms and Graphics*

The New Paradigm

There is a new way of doing business, a new paradigm, consistent with being all the way in. Tasks that were formerly assigned directly by the BCT to each of its small maneuver support units are now formally assigned to the higher headquarters uniquely responsible for the execution of those tasks—the BSTB. All tasks are assigned by the brigade commander (through the S-3) to the BSTB. It is the responsibility of the BSTB to determine how best to leverage its specialized units to accomplish the mission and meet the commander's intent.

Implicit within this new paradigm is the understanding that commanders and specialized unit leaders do not "work for" staff officers. Gone are the stovepipes and shortcuts whereby BCT staff officers reach down into these small units and issue "fire missions." Staff officers assign tasks to the BSTB. The BSTB commander and his staff translate these tasks into fully planned, synchronized, and resourced missions—**and are held accountable for mission accomplishment!**

Resistance to this new paradigm (What new organization or design does not come without its naysayers?) comes in two forms: The first is the concern that the BSTB introduces an additional layer of bureaucracy between specialized units and the brigade staffs assigning them tasks. On the contrary, the BSTB exists to translate the tasks into simple, executable mission orders while resourcing subordinates for success. More importantly, the BSTB implements necessary measures to prepare units to execute all tasks beyond the traditional capability of staff elements—and then monitors their completion. This concern is further alleviated by BSTB commanders who leverage warning orders, provide dedicated liaison officers, and encourage cross talk between staff sections (brigade – battalion) and between brigade staff elements and the specialized units under their command.

The second resistance to this new approach is from those who feel that the old way was working fine, negating the need for change. (They are **not** all the way in!) What they cannot possibly know (until they see it in action) is...compared to what? Compared to the deliverables possible when a *battalion*, with all of its resources, is put on the mission for which we used to ask a staff section at one or two persons deep? Not even close. Compared to the synergy possible when a *battalion*, all the way in, focuses all of its resources on the planning, preparation, and execution of tasks to meet the brigade commander's intent? It is an order of magnitude difference.

BSTB Doctrinal Key Tasks

Key to accepting the premises implicit within the new paradigm is an understanding of the doctrinal tasks and functions now provided by the BSTB. These are the value-added functions that must be routinely provided to address the problems associated with the command and control of small units. They are among the limiting factors that prevent staff officers from being able to do more than assign tasks, and the type of deliverable for which the BSTB is now responsible. They are the critical details that are often the difference between good...and great.

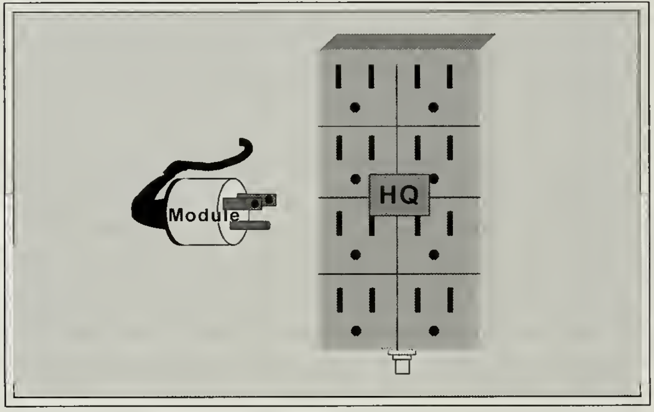
- *Exercise command and control over BSTB units during the preparation and execution of BCT-directed missions.* BSTB commanders are held accountable for both.
- *Ensure that BSTB commanders and leaders conduct precombat inspections and rehearsals focused on the execution of assigned BCT tasks.* Think about this: Who performed these roles for small units before their assignment to the BSTB?

> The BSTB is an integral component of the modularized BCT. I rely on them every day to lead my low-density unique units and keep their specialized equipment operational.
>
> BCT Commander, 3d Infantry Division

- *Ensure that BSTB unit assets are positioned to execute their assigned tasks.* For the sake of clarification, this requirement is neither to determine the tasks nor to determine the required positioning. Those tasks are accomplished at the brigade staff level. Consistent with the new paradigm, the BSTB ensures that the tasks are accomplished in order to meet the BCT commander's intent.
- *Coordinate to ensure that combat service support, force health protection, and security are provided for BSTB organic and attached units positioned throughout the BCT AO.* The BSTB does not have the capability to resource every one of its subordinate units across the width and depth of the BCT AO. Its mission is to coordinate resources and, when required, to provide the resources themselves.
- *Coordinate or provide security for organic and attached units moving throughout the BCT AO.*[2] Small units cannot generally secure themselves. The BSTB is responsible for coordinating security through the supported unit or, if

required, providing the security itself. It's no surprise—there are no "security units" within the BSTB. The combined resources in the team of teams must work together to provide necessary security assets.

A critical function woven throughout each of these tasks is the requirement of the BSTB to capably address attachments and detachments. The capacity of the brigade to receive modules is directly related to the ability of the BSTB to serve as the "socket" for the incorporation of any number, form, and function of modular "plugs." The BSTB must have adequate standing operating procedures (SOPs) to address the receipt of attachments—to include logistical, administrative, and tactical issues—in order to facilitate their rapid integration into BCT operations.



The final doctrinal role for the BSTB is perhaps the one upon which most BCT commanders rely—*perform roles as dictated by the BCT commander.* These are generally the missions that cross task force boundaries and extend across the full reach of the brigade's AO. Note the heavy *maneuver support* focus in these missions. They include (but are certainly not limited to) the following:

- *Command and control of detainee operations.* Current Army doctrine on detainee operations highlights the criticality of "green tab" leaders at every echelon of detention. BCTs often leverage the BSTB as a natural fit for this role. Who better than the higher headquarters for military police (detainee proponents) and military intelligence (interrogation experts) (i.e., the BSTB) to effectively oversee this vital mission?
- *Forward operating base (FOB) defense.* BSTBs either receive augmentation forces or coordinate between tenant units to provide all elements of base defense, command and control, and life support. This is a "current fight" extension of the rear area headquarters mission envisioned for this battalion during its original design. This critical mission must be planned, resourced, rehearsed, and executed incorporating all elements of base defense.
- *Route reconnaissance and clearance/assured mobility command and control.* BSTBs leverage the unique capabilities of subordinate military intelligence, military police, engineer, and explosive ordnance disposal units to address threats to mobility such as improvised explosive devices (IEDs). This is clearly one of those "cross-boundary" issues in which the synergy of putting all enablers under one common headquarters (assigned the mission and provided with the resources) can have powerful results.
- *Reconstruction headquarters and essential services project management.* BCTs routinely rely on the BSTB (reorganized at the staff level for this mission) to provide oversight for critical infrastructure repairs. Not surprisingly, this mission often becomes the BSTB main effort and ties directly to most of the BCT operational priorities.

In-Theater Validation

BCT commanders continue to rely on their BSTB commanders for some of the brigade's most critical functions. In a recent, informal query of fourteen BSTB commanders, only three responded with battalion missions (specified or implied) that read anything like "force provider." Most common among the respondents was service in the mission areas of base defense (8/14); detainee operations (8/14); and reconstruction/essential services (11/14). Interestingly, rather than force provider, BSTB units are assuming the form and/or function as "nonlethal effects task force," "maneuver support task force," "combined arms effects battalion," and "nonlethal fires battalion." True combat multipliers and value added, indeed.

> The BSTB command team not only executed millions of dollars worth of reconstruction but also aggressively worked with media to get the message out. They offered me a headquarters that could focus on an area that influenced millions of people and influenced the core of the insurgency. They were an invaluable asset to this combat brigade. I wouldn't leave home without them.
>
> BCT commander, 3d Infantry Division

Deployed commanders find that there is simply too much to do and too many critical functions that cross task force boundaries without the synchronization of effects made possible through the BSTB. The stakes are too high to ask small, over-tasked, brigade-level staff sections to *command and control* subordinate units. Successful execution is made possible by putting a battalion headquarters (a BSTB) on those things that require battalion-level resources and effort. Mission accomplishment and the best practices in-theater point to the value added, many times exponentially, of this approach.

Parting Shots

Some mistakenly view the BSTB as a large headquarters company, a force provider of trained and resourced specialized units back to the brigade for tasking and employment. Listen…the Army does not centrally select battalion-level commanders and command sergeants major for those kinds of roles. And with a war going on…it certainly does not need them. That type of approach is not grounded in either combat training center or theater lessons learned and reverts back to the problem that Army leaders felt existed when they created the BSTB! This is a unit designed to "command and control attached and organic units" for missions that reach across the BCT AO.

One word appears repeatedly in any discussion about the BSTB: *execution*. The combining of units under a common headquarters must translate into results. The new paradigm must, in fact, be better. Separate units that were previously unfocused, unsynchronized, poorly resourced, and challenged during execution must now deliver. Simply put, the BSTB—like any other battalion—must accomplish its assigned missions.

Successful execution is made possible through leaders who create synergy. (See note at right.) The combination of maneuver support units that seemingly have nothing to do with each other (military intelligence, signal, military police, engineer, explosive ordnance disposal, civil affairs, chemical) must produce a total that is greater than the sum of its parts. Mathematically: 1+1+1>3. The bulk of the missions provided by BSTBs (reconstruction, assured mobility, detainee operations) are made possible by units that think outside of themselves, that knock down old stovepipes, and that work together for the common good. This is only made possible through branch-immaterial, selfless, team-centric thought and action. That is what being "all the way in" is really all about.

Lieutenant Colonel Magness is an Army War College fellow at the University of Texas. Previously he served as an observer-controller at the National Training Center (NTC) at Fort Irwin, California.

The views expressed in this article are those of the author and do not necessarily reflect the official policy or positions of the Army, the Department of Defense, or the U.S. government.

Endnotes

[1] Field Manual Interim (FMI) 3-90.61, *Brigade Troops Battalion Operations*. March 2005.

[2] Ibid.

Note: "Brigade Special Troops Battalions, Part II: Synergy" will be published in the October-December 2006 issue of *Engineer*.

Dedication

The following members of the Engineer Regiment have been lost in the Global War on Terrorism since the last issue of *Engineer*. We dedicate this issue to them.

Sergeant Carlton A. Clark	2d Brigade Troop Battalion, 2d Brigade Combat Team	Fort Campbell, Kentucky
Staff Sergeant Stephen A. Seale	2d Brigade Troop Battalion, 2d Brigade Combat Team	Fort Campbell, Kentucky
Corporal Jose Zamora	2d Brigade Troop Battalion, 2d Brigade Combat Team	Fort Campbell, Kentucky
Sergeant Jason J. Buzzard	8th Infantry Regiment, 2d Brigade Combat Team	Fort Hood, Texas
Sergeant Ian T. Sanchez	32d Infantry Regiment, 3d Brigade Combat Team	Fort Drum, New York
First Sergeant Christopher C. Rafferty	Charlie Company, 37th Engineer Battalion	Fort Bragg, North Carolina
Corporal Ryan J. Clark	40th Engineer Battalion, 1st Brigade Combat Team	Baumholder, Germany
Specialist Robert L. Jones	40th Engineer Battalion, 1st Brigade Combat Team	Baumholder, Germany
Sergeant Reyes Ramirez	40th Engineer Battalion, 1st Brigade Combat Team	Baumholder, Germany
Corporal Andy D. Anderson	Bravo Company, 46th Engineer Battalion	Fort Rucker, Alabama
Sergeant Carlos E. Pernell	Bravo Company, 46th Engineer Battalion	Fort Rucker, Alabama
Specialist Troy C. Linden	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Specialist Joseph P. Micks	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Staff Sergeant Omar D. Flores	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Sergeant Sirlou C. Cuaresma	62d Engineer Battalion, 13th Containment Command	Fort Hood, Texas
Sergeant James P. Muldoon	68th Combined Arms Regiment, 3d Heavy Brigade Combat Team	Fort Carson, Colorado
Captain Patrick D. Damon	Headquarters & Headquarters Company, 240th Engineer Group	Augusta, Maine
Sergeant Leroy Segura, Jr.	362d Engineer Company, 54th Engineer Battalion	Fort Benning, Georgia
Sergeant Bryan C. Luckey	562d Engineer Company, 172d Stryker Brigade Combat Team	Fort Wainwright, Alaska
Sergeant Dustin D. Laird	913th Engineer Company, 46th Engineer Battalion	Union City, Tennessee

ARMY ENGINEER DIVERS IN THE FIGHT

By First Lieutenant Thomas Darrow

The most common response Army divers hear when explaining their profession—no matter what they are doing or where they are in the world—is "I didn't know the Army had divers." Although Army divers have been in the fight since the beginning of Operation Iraqi Freedom, this response is still heard today in Iraq, Kuwait, and the rest of the United States Central Command (CENTCOM) area of responsibility. The 74th Engineer Team (Dive) and the 544th Engineer Team (Dive) were deployed to serve during the invasion of Iraq in March 2003, and their missions primarily consisted of conducting river reconnaissance, mine clearance, bridge demolition, hydrographic surveys, weapons of mass destruction (WMD) searches, and personnel recovery (see "Army Diver Missions in Iraq," *Engineer,* July-September 2003, page 28.) After completing five months of service, the 544th was sent home, but in December 2005, was again deployed to support Operation Iraqi Freedom. The unit conducted its relief in place (RIP)/transfer of authority (TOA) with the 511th Engineer Team (Dive). Currently, the 544th falls under the Coalition Forces Land Component Command (CFLCC) C-7 (engineer staff section) and Area Support Group–Kuwait (ASG–KU). Although some missions have changed over the past few years, many remain the same.

Scope of Work

The presence and usefulness of the Army diver is historically lost in the constant changing of the guard within CFLCC and Multinational Corps–Iraq (MNC–I). It has become customary for the dive team commander to conduct briefings for the combatant commander and high-ranking officials in Kuwait, Iraq, and Bahrain for CFLCC, MNC–I, and the United States Naval Forces Central Command (NAVCENT) on the Army engineer diver mission and their broad scope of work.

Security Swims

One mission consisted of assisting a Navy explosive ordnance disposal (EOD) unit with antiterrorism force protection (ATFP) security swims at shipping ports within the CENTCOM area of responsibility. To date, the 544th has conducted more than 30 ATFP security swims. The team works with local officials to assist in the port security mission, which usually involves the help of the Navy Criminal Investigation Service (NCIS) and local medical support. The major customer of the ATFP security swims is the Army watercraft team. The watercrafts maneuver throughout the CENTCOM area of responsibility, providing necessary resupply items.

Since the watercraft team is well aware of the usefulness of Army divers, it takes full advantage of the other benefits the dive team has to offer. In addition to conducting hull surveys and clearing screw propellers, the 544th has cleaned the bottom of vessels maintained by the United States Army Materiel Command (AMC). These vessels are part of the pre-positioned stock of Army watercraft maintained by AMC. The divers have also recovered ammunition, weapon parts, and personal equipment dropped over the side of vessels while in port.

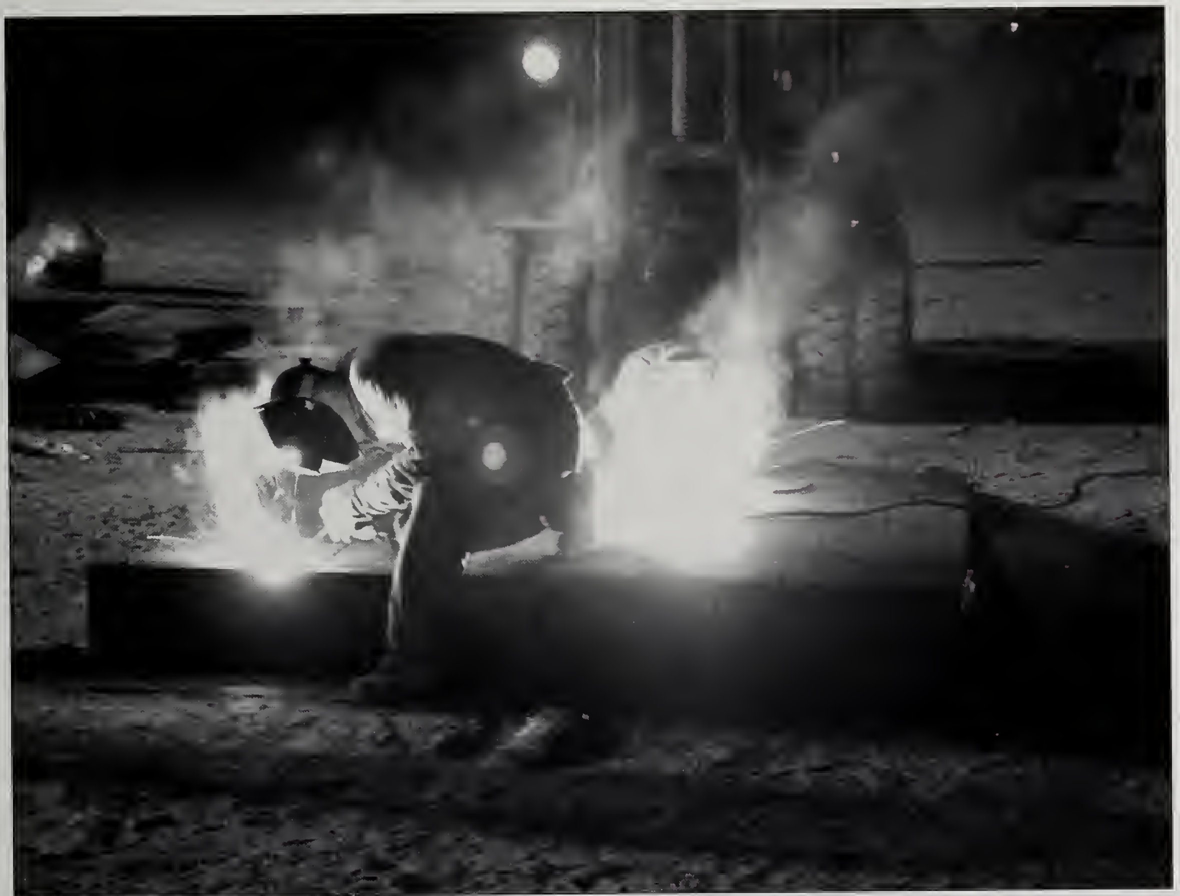
Personnel Recovery

The 544th was also called on for one of the more unfortunate, but honorable, missions an Army diver can accomplish: the recovery of a fallen service member. While planning another mission, an inquiry was received about the usefulness of the Army diver in personnel recovery. Two days later, the team was sent to assist with the recovery of two missing Marines. A troop carrier with nine Marines aboard had flipped over in a river, and two of them had not been recovered. Over an 8-day period, the team diligently searched a 20-kilometer stretch of the river extending from the crash site to the mouth of the Euphrates River. The team located a 50-caliber machine gun, an M16 rifle, an M9 pistol, and multiple 50-caliber machine gun rounds lost in the accident. In keeping with the Army diver tradition, the team did not leave the site until the missing personnel were recovered. Local Iraqi civilians discovered the Marines 70 kilometers downstream from the accident site and turned the bodies over to coalition forces.

Reconnaissance

After returning from that mission, the team was requested for a reconnaissance mission on a flooded basement that was scheduled for renovation. The basement had been mysteriously flooded since 2003, and no one knew why. British forces requested outside diving support for the dive team. Due to the uncertainty of the building's condition, the 544th deployed its remotely operated vehicle and viewed the basement from the safety of the building's driest floor.

During the mission, the 544th was needed for the emergency recovery of a downed Hunter unmanned aerial vehicle (UAV). For unknown reasons, the UAV plummeted into a small lake, and its recovery was necessary to investigate the cause of the vehicle's malfunction. A four-man team successfully recovered all the parts of the UAV. With the deployment of the four-man team, the detachment spread out and worked on separate tasks. Army engineer dive teams are designed by their very nature to be separately employed autonomously of each other, a feat the 544th has successfully accomplished several times since being deployed to Iraq.



Opposite page: Members of the 544th Engineer Team (Dive) recover a 50-caliber machine gun that was found during a search for missing personnel.

Above: A Soldier conducts a welding operation on a metal ramp.

A diver prepares to cut a rudder on a tugboat.

Salvage

During the recovery mission, a request was received to conduct a reconnaissance and salvage of an Iraqi float bridge. The team focused on this task after completing the recovery mission. Destroyed by coalition forces, the bridge needed to be removed from the water so locals could cross the river in small boats as part of their everyday lives. The team decided to send two separate elements. The first team conducted a reconnaissance of the project site, and the second team brought additional equipment and personnel needed to complete the task. After the first team arrived, it was redirected to conduct a personnel recovery from a helicopter crash elsewhere. The team quickly moved to the crash site, deployed side scan sonar equipment to locate the helicopter, and then conducted diving operations around the clock until they recovered the remains of the two helicopter pilots. The other team members sent additional manpower and equipment to help recover the helicopter. After the successful completion of the mission, the team proceeded to work on the reconnaissance and salvage of the Iraqi float bridge.

Other Missions

In addition, the 544th has worked in Kuwait to accomplish other valuable missions. The team conducted an inspection and repair mission of a security system on an oil platform. Future missions at oil platforms have already been developed for later in the year to increase security and improve the quality of life for the Sailors stationed there.

Other missions included joint work with and for the Kuwait navy. The dive team spent 30 days conducting underwater cutting operations on two old Iraqi tugboats that the Kuwaiti navy used for target practice. In order to scrap the tugs, the propulsion system needed to be cut off the bottom of each of the tugboats. Once the team cut the propulsion system, using their underwater cutting equipment, the tugboats were beached and scrapped. They also welded a ramp extension together so a Kuwaiti unit could board its vehicles on Army watercraft to conduct a mission. The Kuwaiti vehicles did not have enough clearance and needed a little lift to prevent damage.

Diver Qualification Process

In spite of such a busy schedule, the team managed to squeeze in a deep diving exercise the first week in March that allowed them to qualify some of its newly dubbed First Class Divers. After promotion to staff sergeant, a diver attends First Class Diver School in Panama City Beach, Florida, at the Naval Diving and Salvage Training Center (NDSTC). After completing the course, the First Class Diver undergoes an extremely intense qualification process to earn the title of being a qualified diving supervisor and capable of operating on his own. These qualifications and corresponding acquired skills are the backbone of the Army diving community. Becoming qualified allows diving supervisors to be deployed independently to any location in the world to conduct diving operations. As an example of the skill and competence of these staff sergeants, the majority of these missions were completed or supervised by staff sergeants operating independently.

No Job Too Large

The Army diving community is small, and the current presence in-theater is even smaller, but as Army engineer divers of the past have shown, and as the 544th continues to demonstrate during its current deployment, no job is too large. Eventually, the combatant commander will no longer be surprised that Army divers exist, but rather be aware of the benefits they offer and seek out those skills.

First Lieutenant Darrow is assigned to Third Army, Area Support Group–Kuwait, while deployed in support of Operation Iraqi Freedom. He was previously assigned to 7th Transportation Group (Composite), 6th Transportation Battalion, United States Army Dive Company (Provisional), Fort Eustis, Virginia. He is a graduate of the Engineer Officer Basic Course, the Diver Course Phase 1, the Sapper Leader Course, the Diving Basic Officer Course, and the Salvage Officer Course. He holds a bachelor's in business management from Providence College, Providence, Rhode Island.

EXPLOSIVE HAZARDS COORDINATION CELL MOBILE OBSERVATION TEAMS

By First Lieutenant Phillip M. Smith

Engineers are performing a major role in defeating the increased threat of deadly improvised explosive devices (IEDs) in Iraq. Their role in the counter-IED fight is to protect military convoys and the Iraqi population by searching for and removing IEDs from the roadways. The engineers work in teams, which are proudly known as *IED Hunters*, as they perform their duties with courage and honor at the risk of losing their own lives. According to statistics from June 2006, route clearance teams account for a significant portion of all IED finds in Iraq.

Explosive Hazards Coordination Cell

In the fall of 2005, officers and Soldiers from the 115th Engineer Battalion were mobilized as the Explosive Hazards Coordination Cell (EHCC)—formerly known as the Mine and Explosive Ordnance Information Coordination Cell (MEOICC)—to support Operation Iraqi Freedom. One of the primary missions of the EHCC is engineer route clearance.

Mobile Observation Teams

In January 2006, the EHCC organized mobile observation teams (MOTs) to help in the counter-IED fight. The MOTs monitor the progress of route clearance teams at the corps level. Their mission is to observe, collect, write, publish, and distribute route clearance information. One of the ways they do this is by observing the best tactics, techniques, and procedures of the route clearance teams and then disseminating this information to the other teams through regularly scheduled conferences. This process of collecting and distributing information captures lessons learned and empowers the teams to be more effective.

The MOTs travel throughout Iraq to meet with and observe all route clearance teams. These visits can last up to several days, depending on the number of teams per engineer company. The MOTs accompany the route clearance teams on their combat missions as specialized observers. Working with the team in this manner—and with a similar mission to

These mine-protected vehicles, the Buffalo and the RG-31, are used in the counter-IED fight.

The robotic arm of the Buffalo searches for suspected IEDs.

defeat IEDs—creates a bond between the MOTs and the route clearance teams that strengthens both groups. The MOTs learn from each team because of the difference in leadership, equipment, and geographical areas in which the teams operate. During the missions, the MOTs ask a variety of questions to the vehicle crews (driver, vehicle commander, and gunner) while they are searching for IEDs. This allows the MOTs to analyze and build on the team's strengths and correct identified weaknesses.

The MOTs share the broader perspective of route clearance operations with route clearance commanders and their teams, as well as the latest information on new equipment that is available and how it will be used. They also share their perspectives on problems pertaining to route clearance operations that are not seen at the corps level. Major issues are thereby streamlined and fixed on a mass scale to the benefit of all route clearance teams.

At the conclusion of each visit, the MOTs outbrief the company commander on his team's performance. The briefing generates an official report that is given to his chain of command. Commanders at all levels have welcomed these visits and the assessments of their teams. The MOTs' assessments then are compiled and distributed through briefings or e-mail messages to all of the route clearance community.

Route Clearance Handbook

In April 2006, the MOTs published an unclassified Route Clearance Handbook that provides guidance to route clearance teams and captures the continuity of experience to help train new teams. The handbook is updated monthly with the latest assessments and then redistributed to the coalition forces, the combat training centers, and the United States Army Engineer School. A quote from the handbook says:

> *"This handbook is designed for a platoon-level route clearance team. A new patrol leader to route clearance will be able to read and understand current tactics, techniques, and procedures and how to employ route clearance vehicles."*

Upcoming Products

The MOTs are scheduled to publish a Leaders Operational Handbook in the fall. They are also helping create the doctrine that will be trained to the new Iraqi army route clearance teams. Engineers continue to battle the IED fight through route clearance operations, but it has not been without the loss of great Soldiers. Engineers will continue to *Clear the Way.*

First Lieutenant Smith commands the Headquarters Detachment, 115th Engineer Battalion, and is the leading officer in charge of the MOTs. A prior enlisted Soldier, he has served almost 11 years in the Army National Guard. He is a graduate of the Engineer Officer Basic Course and will soon attend the Engineer Officer Advanced Course. He also holds a liberal arts degree from Frostburg State University, Frostburg, Maryland, with a minor in computer science. Lieutenant Smith is a New Mexico State Police Officer when not called to active duty.

Photo by Milton N. Ricks, Project Engineer, USACE

DAM RESTORATION KEEPS MILITARY MOVING FORWARD

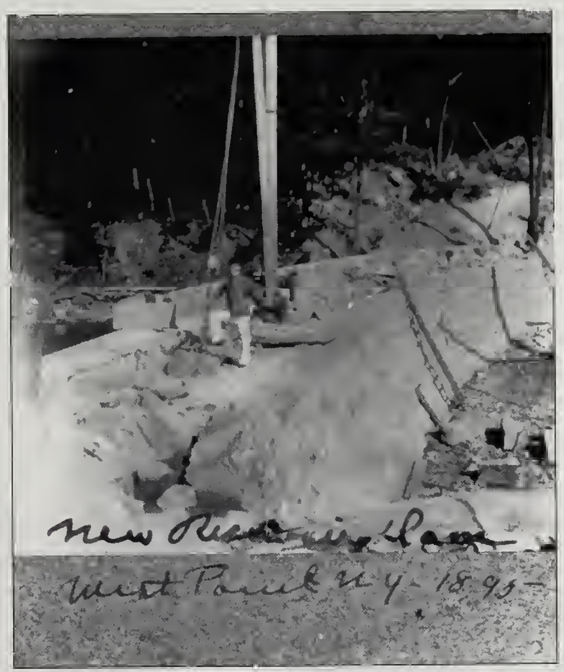
By Dr. JoAnne Castagna

Since 1802, the tradition at the United States Military Academy at West Point, New York, has been to graduate highly trained military officers. More than 900 cadets are commissioned annually and serve their country to protect our American way of life.

The Academy (established primarily to train engineers) and the United States Army Corps of Engineers® (which began its roots at West Point) have shared a close relationship and worked together to ensure that Army officers are prepared for their missions by providing optimum training and living facilities.

The Academy sits on the western shore of the Hudson River, approximately 50 miles north of New York City. This past winter, the Corps's New York District began restoring a historic dam and reservoir, near the shore of the Hudson River, on the grounds of the sprawling campus.

In the late 1800s, the Academy needed an additional source of drinking water. So in 1895, the Corps augmented the Academy's drinking water system by constructing the Lusk Dam and Reservoir, now considered significant elements within the Academy's National Historic Landmark property.



A Corps engineer stands on the recently constructed Lusk Reservoir Dam in 1895.

Lusk Reservoir Dam, West Point, New York

The reservoir dam is a large, arched masonry block structure. The dam—which was constructed under the direction of Captain James L. Lusk, a West Point graduate—created the reservoir. To date, water is piped in from area ponds and creeks to the reservoir.

In 2004, a Corps inspection—conducted by the New York District—showed that leaks were present behind a buildup of efflorescence (crystallization that had accumulated on the dam's surface), raising concerns that there could be a more serious problem down the road if the dam was left unmonitored. Since the dam is located upstream and adjacent to several high-occupancy Academy facilities, any potential structural problem is unacceptable.

During the winter of 2005, the New York District performed the dam's first cleaning in its more than 100 years of service. The joints on the downstream face of the dam were cleaned of the efflorescence, and the leaks that were covered by the crystallization crust were located, cleaned, and sealed. The cleaning provided the Corps a "fresh face" to observe and categorize the leaks present in the dam and determine if further repairs were needed.

Efflorescence is caused by the dissolving calcium carbonate in the dam's mortar. The reservoir water is slightly acidic and chemically reacts with the mortar between the dam's stones. When efflorescence builds up over the stones, it becomes difficult to determine the location of leaks because the water from a leak moves under the efflorescence crust and away from the leak source. By cleaning away the efflorescence, the leak's actual location is seen.

It took a month to clean the dam. The stones were sandblasted clean with small coarse-grained silica (glass-like particles) under high water pressure, removing the calcite buildup along the seams of the dam's masonry stones. Workers performed the cleaning by standing on a platform (similar to those used by high-rise building window washers) that was lowered over the side of the dam's stone balustrade and 8-foot-wide brick walkway.

If the dam had not been cleaned, the Corps would not be aware of the severity of the seepage problem, which could have resulted in a more significant problem. The leaks are being monitored, not repaired, at this time.

Engineers who plan to perform similar dam restoration work should—

- Work closely with environmental and cultural resources staffs on the project because they can be invaluable in the selection of the proper cleaning method. Even though the main focus of the project is dam safety, it's important to remain aware of the environmental and cultural resource impacts of the work being performed.
- Ensure that there is enough time to perform the project. For example, if the dam is located in a cold-climate region, avoid the fall timeframe, which could shorten the restoration time.

In the near future, the Corps plans to inspect the structural condition of the Lusk Reservoir Dam's upstream face using a dive team because this portion of the structure needs to be visually examined. Corps personnel hope to correlate the leak locations on the downstream face with the upstream face cracks, which will allow them to determine what work is needed in the future.

Dr. Castagna is a technical writer/editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

The EOCA Course and the UMBC

By Mr. Michael Dascanio and Sergeant Major Joseph Harris

The United States Army Engineer School is committed to providing excellent training opportunities for all units in support of the Army Force Generation (ARFORGEN) cycle. We are constantly improving the courses and enrollment processes for the Explosive Ordnance Clearance Agent (EOCA) Course and the Urban Mobility Breaching Course (UMBC). We extend our congratulations to the organizations that have equipped their units with these valuable capabilities by sending Soldiers to these courses. We continue to receive excellent feedback from units in-theater and look forward to providing these capabilities to the rest of the Regiment.

Descriptions

EOCA Course. This course is designed to train skill levels 10 through 40 (E-4 [P] to E-7) combat engineers (21B) and select engineer officers (O-1 to O-3) on the basic skills and knowledge required to perform as EOCAs. These Soldiers will receive training in the following areas: reacting to an unexploded ordnance (UXO) hazard; EOCA roles and responsibilities: ordnance terminology; safety; color codes and markings; explosives and explosive effects; demolition operations refresher; EOCA Identification Guide overview and application; ordnance identification; protective measures; EOCA reconnaissance; marking; disposal of selected UXO (in-place only), as identified in the EOCA Identification Guide, in the conduct of engineer-specific area and route clearance operations, reporting procedures, and robotics. The course encompasses an intensive command post exercise (CPX)/ practical exercise (PE) to use newly acquired engineer skills in a series of explosive ordnance clearing operations.

UMBC. This course provides advanced information on urban breaching operations. Soldiers will receive training in the following areas: in-depth explosive theory; detailed planning that combines operational and training safety issues; urban reconnaissance; employment of urban breaching assets, including explosive, manual, and ballistic breaching techniques for urban operations; and use of Current Force equipment that supports mobility operations in support of the maneuver force.

Prerequisites

EOCA Course. To be eligible for this course, Soldiers must—

- Obtain an Armed Services Vocational Aptitude Battery (ASVAB) general maintenance (GM) score of 105 prior to January 2002 and 104 after January 2002.
- Be of the rank of E-4 (P) through E-7 and O-1 thru O-3.
- Have at least an interim secret security clearance.
- Have normal color vision.
- Be qualified in their military occupational specialty (MOS) 21B series.

UMBC. To be eligible for this course, Soldiers must—

- Meet the requirements listed in Department of the Army Pamphlet 611-21, *Military Occupational Classification and Structure*, and Army Regulation 600-9, *The Army Weight Control Program.*
- Be a combat engineer in the grade of E-5 (P) through E-7 and a graduate of the Basic Noncommissioned Officer Course (BNCOC).
- Have no pending Uniform Code of Military Justice (UCMJ) actions.
- Have no limiting profiles.

We are continuing our efforts to support all units that are priority on the ARFORGEN cycle. Your support is needed as we proceed in equipping units with this EOCA/UMBC capability. Please comply with the enrollment instructions on page 56. We are currently allocating slots to each unit prior to deployment in order to support your training needs and increase your capabilities.

Allocations

ARFORGEN engineer units across the Regiment will have priority sequentially according to the ARFORGEN cycle to attend these courses. Each unit will be allocated three slots per class for the EOCA Course and UMBC. Unit representatives/S-3s must enroll Soldiers in these courses, using the Army Training Requirements and Resource System (ATRRS), once the unit receives allocations to attend the training.

Unit Requirements

Soldiers must receive basic familiarization demolition training from their unit before attending the EOCA Course. They must submit a memorandum signed by their unit commander, through the battalion or brigade commander, to the Directorate of Training and Leader Development (DOTLD), United States Army Engineer School, to confirm their name and attendance date. Soldiers must have at least an interim secret security clearance. Waivers can be approved for course attendance, with the exception of the security clearance requirement.

The Engineer School is in the process of recertifying Soldiers who are EOCA-qualified. To maintain the additional skill identifier (ASI) (E-8), there will be a certification course mobile training team (MTT) to train Soldiers.

Points of Contact

The points of contact concerning these courses are Mr. Michael Dascanio, the DOTLD Technical Director, United States Army Engineer School, (573) 563-4093; or Sergeant Major Joseph Harris, the DOTLD Sergeant Major, United States Army Engineer School, (573) 563-4093.

Urban Mobility Breaching Course

Fiscal Year 2007 Schedule

Class No.	Report Date	End Date
01	15 Oct 06	3 Nov 06
02	26 Nov 06	15 Dec 06
03	21 Jan 07	9 Feb 07
04	25 Feb 07	16 Mar 07
05	15 Apr 07	4 May 07
06	3 Jun 07	22 Jun 07
07	5 Aug 07	24 Aug 07

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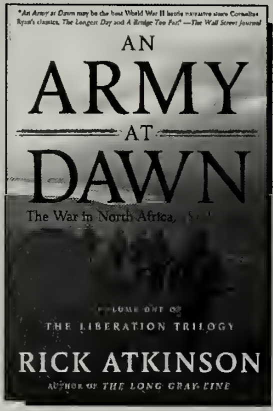
Book Review


AN
ARMY
AT
DAWN
The War in North Africa, 1942-1943
VOLUME ONE OF
THE LIBERATION TRILOGY
RICK ATKINSON
AUTHOR OF THE LONG GRAY LINE

An Army at Dawn: The War in North Africa, 1942-1943, by Rick Atkinson, Henry Holt and Company, LLC: New York, 2002, 704 pages, ISBN: 0-8050-6288-2, $30 (hardcover).

• • • • • •

An Army at Dawn concerns America's initial involvement in World War II. Mr. Atkinson covers the coming of age of the U.S. armed forces and their leaders, to include many details—personal and political. No punches are pulled in the rivalry between British and American forces or their leadership. Names like Eisenhower, Patton, Bradley, Montgomery, Rommel, and Clark come to the forefront and remain there until the defeat of the Axis powers in Europe.

The Tunisian campaign, Atkinson shows, was undertaken by an American Army lacking in training and experience, alongside a British army whose primary experience had been of defeat. Green units panicked, abandoning the wounded and weapons. The author points out the numerous strategic and tactical errors made on the various battlefields. Mistakes were made not only by the generals but also by people in charge at lower levels. This included very basic errors, such as not sending out reconnaissance units or initiating tank attacks without proper artillery or air support. Many brave men were sent to their deaths in useless and ill-conceived actions. Sometimes, just the sheer confusion of the battlefield was responsible or just plain error, such as artillery falling short or planes bombing their own personnel. So, you see, this was where the Americans learned to fight the war.

As the first book in a trilogy, I can hardly wait for the next volume. Don't let the size of this book intimidate you; it is a fantastic account of a little-documented phase of America's entrance into World War II.

This book review is provided by Mr. Jeffrey L. Rosemann, an instructional systems specialist with the Officers Education Branch, Department of Training Development, United States Army Engineer School. A retired infantry Soldier, Mr. Rosemann also served as the 2d Infantry Division historian during the beginning of the 50th Anniversary of the Korean War.

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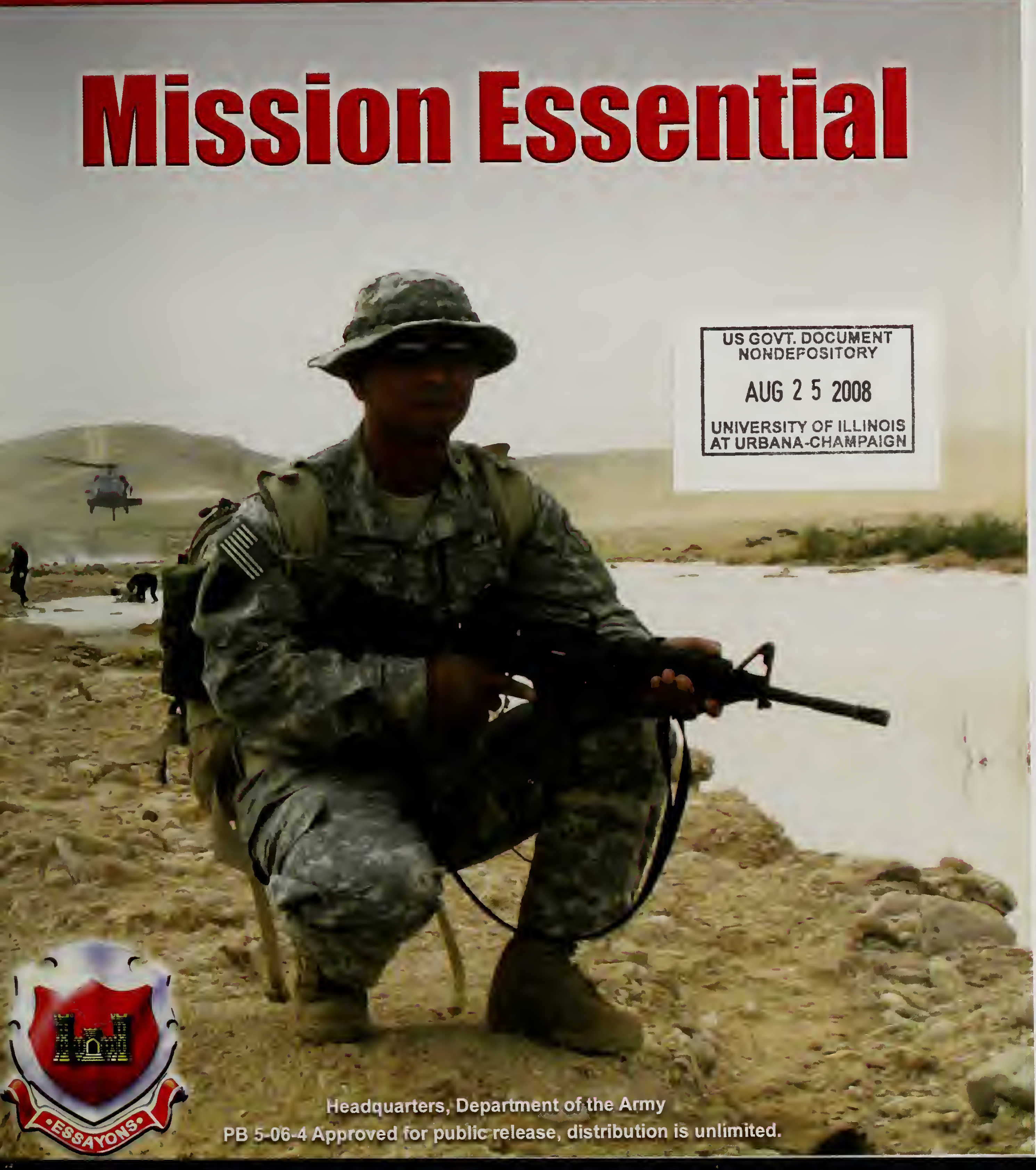

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Front Cover: The 544th Light Diving Team platoon sergeant provides security during a recovery operation. Photo by Staff Sergeant Kurt Langley.

Back Cover: 2007 Best Sapper Competition poster designed by Captain Seth Wacker.

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Clear The Way

By Major General William H. McCoy
Commandant, United States Army Engineer School

Jill and I are honored, privileged, and excited to return to Fort Leonard Wood, Missouri. We cherish this opportunity to serve with a remarkably proficient, innovative, and enthusiastic engineer team. The diversity, commitment, and professionalism of the team (including Soldiers, Sailors, Airmen, Marines, civilians, community members and leaders, and all their respective family members and loved ones) make this a great place to train, work, and live. Our engineers' effectiveness is rooted in the training, doctrine, and materiel development occurring here daily. I would like to commend former and current key leaders of the Engineer School: Brigadier General Todd Semonite; Brigadier General (P) Jack Sterling; Command Sergeant Major Clint Pearson; the command team of 1st Engineer Brigade, including Colonel Mike Iverson and Command Sergeant Major Ioakimo Falaniko; and our dedicated service members, civilian employees, and families for their selfless, tireless, and innovative efforts to train, transform, deploy, and take care of our engineer team.

Our Army and Regiment are experiencing one of the most challenging, dynamic, and rewarding periods in their history. The selfless service and sacrifice of our Soldiers, civilians, and families in support of the GWOT is exemplary and a testament to their commitment to defending peace, liberty, freedom, and democracy. Support from families, FRGs, rear detachments, and communities are paramount to our success and ability to persevere in this challenge. Jill and I are incredibly touched and moved by the personal examples of courage, commitment, and selfless and patriotic service we've observed since the inception of this war. Each day we witness acts of kindness, strength, and passion which truly make our *Army Strong*.

Our Regiment's ability to support the incredible OPTEMPO associated with the GWOT—equating to multiple deployments by our engineer forces from Active Army, Reserve, and National Guard forces, while simultaneously accelerating transformation of some units—is indicative of the resolve, innovation, and flexibility of the total team. The fusion cell continues to serve as an outstanding means to affect transformation while sustaining support to the war in a synchronized and integrated manner. I'm inspired by current efforts to establish and sustain a fusion cell process for Reserve engineer forces integrated with efforts to transform the Active Army. Ongoing efforts by Active, Reserve, and National Guard engineer forces to train and transform themselves while simultaneously supporting the GWOT is vital to our ability to provide timely, relative, and responsive support.

Leader development is an absolute investment in our force and future. Quality leadership is essential to winning the war, transforming the force, and preparing for the future force. I encourage leaders at every level to seek and support developmental opportunities for themselves and their Soldiers through assignment opportunities or schooling. I recognize and appreciate the challenges associated with manning the engineer force in support of the ARFORGEN model. My challenge to engineer leaders is to allow Soldiers to attend and complete leader development opportunities despite the pressures of our existing OPTEMPO. We must address this challenge proactively and in parallel with crucial family and personal time during appropriate periods of the ARFORGEN model.

The United States Army Maneuver Support Center and the United States Army Engineer School are using every available resource to train, equip, and protect Soldiers. Leaders at all levels are passionately and aggressively committed to DOTMLPF integration and ensuring the timely development of the right doctrine and materiel to fight the current and future war. Efforts by organizations such as the Counter Explosive Hazards Center (CEHC) to address current challenges, such as IED defeat, at an unprecedented rate are indicative of the resourcefulness, initiative, and innovation necessary to accomplish the mission while safeguarding and protecting our forces. The Engineer School is the subject matter expert in mine detection and specialized search dogs, a proven capability in the theater of operations. The solutions are innovative, complex, and dynamic, much like the threat. Technology and materiel alone can't resolve the challenge. Leadership is the critical component to addressing these challenges as we've seen demonstrated time and time again since the beginning of the war. I applaud the efforts by our engineer leaders and Soldiers to establish, sustain, and enforce the standards and discipline to counter the threats to our forces, reduce and eliminate our vulnerabilities, and care for our Soldiers and families.

I ask that we continue to remember our Soldiers and civilians who have made enormous sacrifices in the service of our nation. Please reflect on their service and join me in keeping our brave deployed service members and their families foremost in our thoughts and efforts.

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

I hope that all of our engineer Soldiers and families had a happy and safe holiday season! As I reflect back on the many accomplishments of the past year, I am constantly reminded of the tremendous contributions and sacrifices made by our Active, Guard, and Reserve Soldiers and their families while our nation is at war. And as we begin the new year, I would like to welcome Major General William McCoy and his wife Jill back to Fort Leonard Wood as the Maneuver Support Center (MANSCEN) commander and commandant of the Engineer School.

In our continuing efforts to *Transform*, *Train*, and *Take Care of the Regiment*, I will provide you some insight by addressing the Noncommissioned Officer Education System (NCOES), situational awareness, and modularity.

NCOES. As we continue to transform the Regiment in concert with the Army, we are constantly adjusting our NCOES by implementing current lessons learned in our programs of instruction (POIs). Our goal is to maintain information relevant to missions our NCOs are performing. I am pleased to say that the engineer Advanced Noncommissioned Officer Course (ANCOC) and the Basic Noncommissioned Officer Course (BNCOC) are meeting this challenge head-on.

The continued construction of the MANSCEN NCO Academy forward operating base (FOB) by engineer NCOES students has added a great sense of realism to all tactical training, serving as an outstanding base of operations as well as providing realistic conditions for vertical and horizontal construction missions. In addition, ANCOC and BNCOC are continuously updating course material to keep up to date with the fielding of new equipment and techniques.

Soldiers enrolled in ANCOC and BNCOC will also have the opportunity to receive portions of the Search Advisor Course and will receive emphasis on sewage, water, electricity, academics, and trash (SWEAT); vertical and horizontal construction projects; lessons learned; and counterinsurgency operations. Lastly, to aid our leaders in training, we are leveraging the assets on Fort Leonard Wood by integrating search and mine dogs through demonstration and implementation during the special training exercise (STX).

Situational Awareness. One of the many challenges facing our Soldiers on a daily basis is situational awareness. To combat the information gap, the NCOES is testing recognition of combatants in urban environment, (ROC-U), recognition of combatants and improvised explosive devices (ROC-IED), and recognition of combatant suicide bombers (ROC-SB). These programs are designed as virtual trainers that a Soldier can use as a situational awareness training model dealing with combatants, IEDs, and suicide bombers.

The NCOES is working hand in hand with the Night Vision Laboratory to develop what may become one of the single most important predeployment training tools to help Soldiers and leaders know what's taking place on the battlefield. In addition, all Soldiers attending ANCOC and BNCOC will receive exposure to three programs and provide feedback directly to the Night Vision Laboratory to make the product better. Eventually, the ROC-U, ROC-IED, and the ROC-SB will be a Web-based individual self-development tool that every Soldier can access to train on virtual scenarios that they may be faced with while deployed. The training tool can be updated as the environment and conditions change.

Modularity. The Fusion Cell continues to facilitate weekly discussions on engineer units that are converting, activating to the new modular design with help from FORSCOM, HRC, and DA. The activations of the 4th Engineer Battalion, Fort Carson, Colorado; 7th Engineer Battalion, Fort Drum, New York; and 326th Engineer Battalion, Fort Campbell, Kentucky, in October bring the total number of modular engineer battalions to seven. The 11th Engineer Battalion, Fort Benning, Georgia; 5th Engineer Battalion, Fort Leonard Wood, Missouri; and 14th Engineer Battalion, Fort Lewis, Washington, will become modular units within the next few months.

In closing, I am extremely proud of our Regiment's Soldiers for their contributions and positive impact over the past year. I am especially proud of the sappers who are deployed around the world in harm's way. To those who have paid the ultimate sacrifice in the cause of freedom, justice, and the American way of life, neither you nor your families will be forgotten.

God Bless America!

Brigade Special Troops Battalions

Part II: Synergy

By Colonel Thomas H. Magness

This is the second of a two-part discussion on the brigade special troops battalion (BSTB). The first part, "All the Way In," appeared in the July-September 2006 issue of ***Engineer*** *and highlighted the need for full commitment to this new way of conducting maneuver support operations and the value added to the supported brigade combat team (BCT). This second article describes the specific behaviors that must be present within the BSTB in order for its diversity to be a strength and for these disparate units to fight and win as a team of teams.*

The United States Army has recently formed a new combat organization within its fighting brigades—the special troops battalion. Created by joining signal, intelligence, engineer, chemical, military police, and other specialized maneuver support units under a common command, this unit's leaders face a daunting task—build a team of teams out of these diverse functions. Somehow they must combine these dissimilar units into a cohesive, fighting organization and make them better than when they operated independently. The mission—for leaders ready and willing to step up to it—is to create *synergy*.

Many Army leaders and BSTB team members continue to be challenged, however, to embrace the promise of this new organization. They are seemingly encumbered by memories of life as an independent. They cannot yet comprehend, for example, the advantage of replacing *independence* with *interdependence*. They do not know the potential greatness of the new team. They have not yet seen the value of working, fighting, and succeeding—as a synergized team of teams—together.

Successful BSTB leaders quickly realize that it takes more than a common headquarters for combat units to fight as a team. Commanders quickly recognize that T-shirts, logos, and battalion coins don't create synergy. Accomplished team builders know that much more is required. Successful mergers and acquisitions, even in the military, don't happen by themselves. Nope…that's the leader's job. This article then is a challenge to leaders to understand the concept of synergy, accept the absolute requirement for it within the ranks of the BSTB as the enabling characteristic for success, and put the appropriate energy behind measures to make it a reality.

Synergy

Synergy can be reduced to a simple mathematical equation: $1 + 1 + 1 > 3$. The whole is made greater than the sum of the parts. Leadership is the action verb (*made* greater) that enables this possibility. Synergy, like so many other products of effective leadership, is only enabled by dynamic, visionary, positive leaders. Without leadership, you'll end up with acquisitions that never quite fit together (in a business sense, think of AOL™ TimeWarner) and an organization whose parts may actually decrease the value of the sum.

> Synergy – The interaction of two or more agents or forces so that their combined effect is greater than the sum of their individual effects.
>
> *www.Dictionary.com*

BSTB leaders are uniquely positioned and specifically trained and employed to add value to the team, to create functional, effective teams of teams. Leadership is the grease that eliminates the friction inherent in team building. It is the forcing function which ensures that the BSTB team of teams is, in fact, better than its former condition—more efficient, more productive, and a true combat multiplier for its supported BCT. But putting a group of separate companies and small units together under one roof does not guarantee synergistic success. Bigger is not better. *Better is better!* BCTs must be better served *with* the BSTB than *without* it.

Common Vision/Common Goals

Leaders must create the common purpose for which the team will fight—together. Groups, no matter how mature, must have a reason for working together that makes sense to all team members. Without common goals, organizational tendencies are to form stovepipes, build up barriers, and focus on themselves. The fact is, without the synergy that comes from working together, BSTBs are not able to deliver for their supported BCTs critical *battalion* missions such as—

- Route reconnaissance and clearance and assured mobility operations.
- Command and control of detainee operations.
- Nonlethal effects and targeting.
- Reconstruction and essential services project management.
- Forward operating base (FOB) defense.
- Support and secure BCT command and control nodes.
- Sensitive site exploitation (SSE).

Synergy comes from teams and team members who are truly committed to team play. Note that every mission on the list above requires multiple elements of the BSTB—working together to support the BCT. BSTB leaders must forge the overarching organizational vision that describes the intended end state and the accomplishment of team goals. Leaders provide the vision of how great the team can be under these new conditions. As is always the case with "the vision thing," leaders must believe it themselves and then share it (frequently...and with passion), first with internal customers (get your team to believe) and then with everyone else.

BIG TEAM – Little Me

Synergy is created when BSTB team members subordinate their personal and small-unit goals to those of the bigger team. They must have the belief and understanding that they are successful only if the team is successful. The old way of doing business must be replaced with a new way—better and fully integrated into the BSTB and its supported BCT.

Emphasize team goals at every opportunity. Use team rewards to highlight the benefits of working together. Reinforce behaviors that demonstrate the desired corporate mindset. The challenge for BSTB leaders is to balance the need to work as a team while still sustaining the competitiveness that drives subordinate units to do their best.

Synergy is achieved by teammates who seek ways to do their best while striving to make each other better. Streamlined processes and efficiencies are realized by team members who look outside themselves to help others. Information and lessons learned are shared. The whole is greater than the sum of the parts.

Interdependence

Synergy is only made possible by teams that replace independence with the newness of interdependence. Organizations whose members are mutually dependent on each other's unique skills, experiences, and capabilities are more inclined to work together toward a common, higher goal. They are also less inclined to grow in size and scope versus leveraging unused capacity elsewhere in the organization.

The United States Army Corps of Engineers® serves as an example of an organization working through the implications of interdependence. In its case, current budgets no longer afforded each regional organization to create fiefdoms known as "districts" with full functionality whose sole focus was internal—district goals and district customers. Now, regional and national centers of expertise are available to each Army Corps district, with designs for projects in one district completed by teams with unique capabilities in another. Business processes have been modified to reflect the elimination of stovepipes and local behavior. Not only does interdependence make better business sense, it produces a better product and leads to a more satisfied customer. The Army Corps is working hard to do more—and do it better—with less. That is synergy.

In the BSTB, interdependence might lead to better intelligence sharing between tactical human intelligence (HUMINT) teams (THTs) and engineer and explosive ordnance disposal (EOD) units regarding improvised explosive devices (IEDs). The signal company leverages its capabilities to facilitate THT and civil affairs (CA) team reporting. Resources are pooled to create security elements to enable the battlefield circulation of small maneuver support units such as THTs, CA, SSE, and EOD teams.

> The BSTB's ability to harness the energy of units that would normally have stayed in their own lane (signal and military intelligence) while deployed and use this to enhance the capabilities of the brigade was phenomenal. The BSTB's overwatch allowed me to double my capabilities for routine combat functions like forward operating base (FOB) force protection, convoy escorts, and mayor's cell responsibilities.
>
> *BCT Commander, 3d Infantry Division*

BSTB leaders must grow interdependent organizations that share everything—resources, information, skills, people, and facilities. It is only in doing so that the new organization is made greater than the sum of its parts. BSTB leaders must continually "wire-brush" the entire organization to identify unused capacity and determine how it can be applied to help the team, cross-level resources and capabilities between subordinate teams to meet higher-level goals, and build bridges and bonds between mutually dependent suborganizations that will create an effect that exceeds what could be done individually.

Accountability

Synergy is only realized when the team is literally, measurably, actually made greater. The parts must function together to make a better product—faster, more efficient, more reliable, safer, with a greater degree of mission accomplishment...better. Economies of scale must be realized. The supported BCT must see a better product.

Teams do well at that which a leader measures. BSTB leaders must develop metrics for the battalion and for each subordinate organization that can be used for mutual accountability. Create an environment where subordinates are free to "look outside their cubicles" while holding each other accountable for meaningful, quantifiable advancement.

BSTB leaders have the challenge of integrating company-size organizations—each with its own unique, specialized capability—into a functional team. Synergy is realized, for example, when military police are looking across the table at intelligence specialists, questioning various performance metrics and asking how they can help them do better. This measure of accountability and interdependence did not exist in the former organization. The team of teams, to be effective, must recognize that—despite how effectively one unit may perform its battlefield function—if one fails, the unit fails. Together, the whole is so much more powerful.

Team members must be accountable to one another to ensure a better team. This is only possible when they understand each other and appreciate how they each uniquely contribute to their success and the accomplishment of team goals. Use training opportunities such as officer and noncommissioned officer professional development programs to grow teammates who understand the team of teams. Leverage peer reviews to gain perspective on subordinates who work well within the team concept. Share best practices across functional areas to make each component of the whole better than if it were operating separately. Subordinates who understand that their success is only enabled by the success of every team member will begin to think outside themselves to help, and hold others accountable.

Growth/Maturity of the BSTB

An examination of one critical BSTB mission will hopefully point to the threads that demonstrate maturity as a battalion and progress toward making "the whole greater than the sum of the parts." A battalion assigned the mission to "conduct route reconnaissance and clearance operations" across the BCT area of operations looks at this not as a mission for its subordinate engineer and (attached) EOD companies but as a critical mission for the entire team. The following three levels demonstrate the growth and maturity of a synergistic organization:

Level 1. Focus the entire staff on a single mission. The initial steps toward synergy might begin by aligning the entire staff to focus on the accomplishment of a major team goal, such as the clearance of routes. Clearly, this is more than a single company effort and not one that can be passed from brigade to company without additional analysis (where is the value added?). The result is a synchronized *battalion* mission—and the initial signs of a maturing organization.

- S-1: Develop a casualty evacuation plan.
- S-2: Conduct detailed pattern analysis for IED "hot spots."
- S-3: Conduct adjacent unit coordination; develop a synchronized plan.
- S-4: Resource the missions.
- S-6: Develop a communications architecture to support the mission.
- Battalion maintenance officer (BMO): Establish a regeneration station for quick turnaround of route clearance equipment.
- Battalion command sergeant major (CSM): Conduct precombat check (PCC)/precombat inspection (PCI).

Level 2. Focus the entire task force on a single mission. Further growth and maturity is seen from a task force of interdependent subordinate units, each leveraging their unique capabilities to enable mission accomplishment.

- A Company (engineer): Conduct IED reconnaissance.
- B Company (intelligence): Conduct focused HUMINT, signal intelligence (SIGINT), and imagery intelligence (IMINT) for counter-IED operations.
- C Company: Provide additional communications coverage.
- EOD Company: Conduct rapid IED response.
- Headquarters and Headquarters Company (HHC)/BSTB: Fly the Raven unmanned aerial vehicle (UAV) over Tier 1 hot spots; integrate military police.
- HHC/BCT: Provide EOD security patrols; make the chemical platoon available for possible SSE missions.
- CA/psychological operations (PSYOPS): Conduct focused operations for counter-IED.

Level 3. A fully matured BSTB, with a demonstrated ability to focus the entire task force on a single mission, can similarly demonstrate value added for other assigned missions. This is clearly higher-level operations, but is without question the only way the battalion can possibly accomplish the *more* that is asked of it with the *less* with which it has been resourced. But, be sure, this is value added to the supported BCT.

- Base defense.
- Reconstruction command and control/essential services project management.
- Command and control of detainee operations.
- Training of host nation units (for example, engineer, EOD, military police).
- Military intelligence and signal operations.

A Challenge to Leaders

While jerseys do not a team make, BSTB leaders must be aware of the need to build a unique brand around their team of teams. Use cross-training and developmental assignments between organizations to foster a better understanding within subordinate units that otherwise

(Continued on page 13)

Staying Ahead of Change

By Captain Stephen T. Peterson

Every engineer battalion in the Active Army will redeploy, restation, or restructure (R3) this year. However, the 94th Engineer Battalion (Combat) (Heavy) completed all three of these transforming actions in the same calendar year. The 94th redeployed from Mosul, Iraq, in January 2006, and restationed from Vilseck, Germany, to Fort Leonard Wood, Missouri, in June 2006. Throughout the entire change, they restructured from a three-company engineer battalion (combat) (heavy) to a modular five-company construction effects battalion. This combined effect is best visualized by Figure 1, BG Todd Semonite's "Perfect Storm" slide.

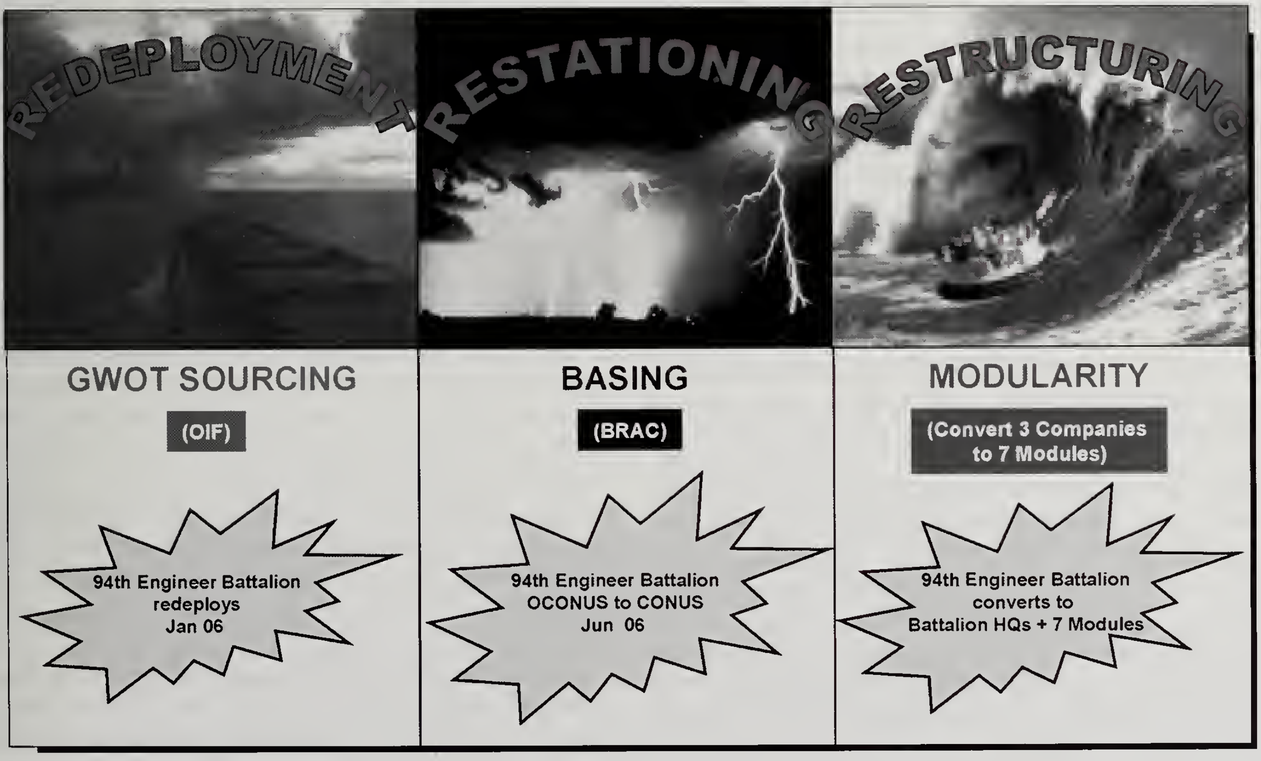
Staffing and decisions for these three separate actions go through different commands and agencies without systemic coordination at the Army level. Decisions made through one process have effects on the other two; thus, changes are inevitable.

Keys to Staying Ahead of R3

Change is not the enemy or a threat; lack of proactive planning and execution is! Dynamic changes create dynamic fusion opportunities and continuity challenges. Just as we must stay one step ahead of the threat in Iraq and Afghanistan, leaders must proactively plan and execute to stay one step ahead of change. As the 94th modularized, it learned the value of staying one step ahead of change.

Proactive Planning

The battalion conducted an effective and deliberate military decision-making process (MDMP) for redeployment that clearly integrated battalion staff and company operations. However, the battalion did not use the same level of planning for restationing or restructuring. Actions in one phase had



GWOT SOURCING

(OIF)

94th Engineer Battalion redeploys Jan 06

BASING

(BRAC)

94th Engineer Battalion OCONUS to CONUS Jun 06

MODULARITY

(Convert 3 Companies to 7 Modules)

94th Engineer Battalion converts to Battalion HQs + 7 Modules

Figure 1

effects on the others. One operation order must address R3 as three separate lines of operation that are executed concurrently—a higher-level MDMP and planning process. The sheer planning requirement outweighed the experience and capabilities at the battalion level.

The greatest hindrance to a deliberate MDMP for restationing was the inability at the battalion level to change key assumptions to facts. Key assumptions dictate multiple branch plans. The best example of a key assumption is "unit move" versus "cadre move." The Department of the Army had to decide if it would be a unit move (everyone goes with the unit to Fort Leonard Wood) or cadre move (10 percent of the battalion moves to Fort Leonard Wood and 90 percent changes duty station based on the Army's needs). The final decision was made a month before the move, with the Army compromising between the two.

Instead of restationing with a coordinated plan, the move was executed from daily audibles. The battalion's main focus was clearing Vilseck, so more focus was needed on planning and coordinating the move to Fort Leonard Wood. The advanced echelon (ADVON) must establish a substantial presence at least six months prior to better assist in the planning of the move.

Restructuring was an underlying line of operation that started in Iraq and finished with fielding new equipment to the battalion. The end state was clearly defined in the approved modular modified table of organization and equipment (MTOE). However, the process of getting from the old MTOE to the new one was cumbersome, complicated, and covered in supply transactions. The 94th went from a headquarters support company and two line companies to a headquarters and headquarters company, a field service company, a vertical company (77th Engineer Company), two horizontal companies (103d Engineer Company and 232d Engineer Company), a concrete detachment (83d Concrete Team), and a survey and design team (156th Survey Team) and added the Fort Leonard Wood firefighter detachment (562d Firefighter Detachment) in October 2006. The number of lateral transfers of personnel and equipment was monumental. Although the battalion property book office effectively spaced the requirements over 16 months, it was supply-centric and not directly synchronized with other staff sections or battalion lines of operation. Never delay a supply or restructuring action if it can be done immediately.

Fusion

Through early identification of the "perfect storm" condition for the 94th and the creation of the United States Army Engineer School Fusion Cell, the Engineer Branch maximized opportunities and found funds for the tremendous cost of R3. Military and community leaders on both sides of the ocean took progressive action to ensure the success of the 94th Engineer Battalion upon restationing. The battalion received a warm welcome from both the military community of Fort Leonard Wood and the surrounding areas.

Based on proactive and forward-thinking leadership, the battalion set conditions for success at Fort Leonard Wood in 2006 while still deployed in 2005.

- Companies began lateral transfers of equipment to the new modular MTOE based on directives from the property book office.
- The battalion commander requested and received approval from the United States Central Command, the United States European Command, and the United States Forces Command to ship equipment straight from Iraq to Fort Leonard Wood.
- They carefully designated the cadre of leadership—an invaluable officer or noncommissioned officer in each staff section—that would take the battalion through the entire process, ensuring continuity.

The battalion command sergeant major convened a committee, the post redeployment effects committee for incident suppression and elimination (PRECISE), that consisted of first sergeants and junior enlisted who developed an effective action plan for the battalion's move from Iraq to Germany. The priority of effort for restationing revolved around four mission-essential tasks: *welcome*, *receive*, *integrate*, and *acclimate* every Soldier and family member to the new duty station. Each is a clear and achievable task.

Family Readiness Groups

The battalion Family Readiness Group (FRG) steering committee and the company FRGs were critical to continuity during this turbulent period for family members. Accurate and timely information flow greatly reduced the stress and uncertainty of R3. The active and responsive chains of concern and contact lists worked well during redeployment and restationing. FRGs were the glue of continuity during the unit move, quickly establishing a sense of community. The battalion hosted a consolidated FRG meeting in the first three months, but the companies started their own meetings in the fourth month. Transferring available FRG funds at the company and battalion levels provided resources to host events and welcome families to Fort Leonard Wood.

The significant reduction in pay from deployment to an outside the continental United States (OCONUS) assignment to a continental United States (CONUS) assignment created stress for the families. Also, OCONUS to CONUS moving expenses averaged twice as much as the dislocation allowance (DLA). Leaders and FRGs should facilitate financial planning and budgeting to reduce financial stress and other stresses inherent with a move.

Personnel

By far, the most stressful factor in the move for leaders, Soldiers, and family members was the late order process. Delayed orders meant unnecessary stress on the Soldier, family members, and the Vilseck community (Stryker Brigade inbound simultaneously). Once at Fort Leonard Wood, Soldiers and family members were without their privately-owned vehicles and household goods for months.

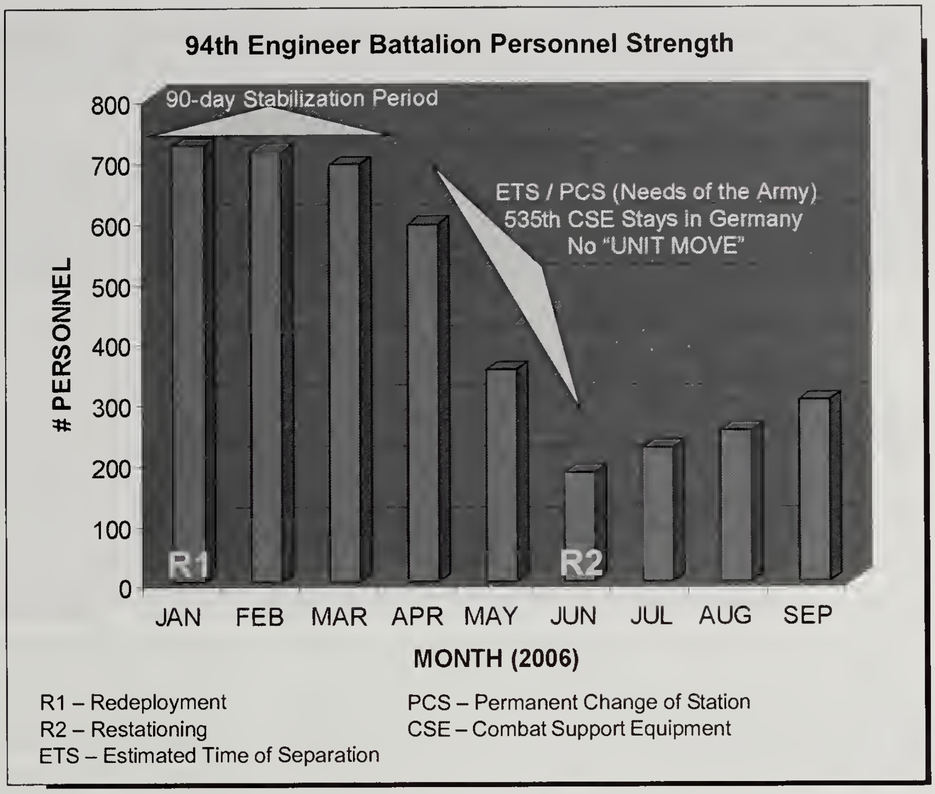


Figure 2

The S-1 is a critical area for transitioning through restationing effectively. Evaluations, awards, legal actions, and orders affect all battalion members, whether leaving the unit or moving with the unit. Upon restationing, the S-1 must quickly establish inprocessing procedures, new unit identification codes, and new office symbols.

Communications

Shoot, move, and communicate! These are always the three critical tasks to every combat operation. R3 is all about moving and communicating. Similar to deployments, site surveys and advance parties are essential. An early and thorough site survey sets the conditions for everything that follows. Establish an ADVON early (180 days prior) with adequate personnel (at least one noncommissioned officer per company and staff section), and ramp-up as the time gets closer. Conduct weekly video teleconferences between the ADVON and the main body. A communication breakdown resulted in the battalion loading six military-owned demountable containers (MILVANs) of furniture that was covered by a furniture contract at Fort Leonard Wood.

At company level, the process was extremely challenging for property and supply accountability. Mass consolidation of primary hand receipt holders before leaving Iraq was normal. For example, headquarters and headquarters company went from 24 primary hand receipt holders to 9 (designated Fort Leonard Wood cadre). Companies left almost 75 percent of their rolling stock in Iraq and conducted large-scale lateral transfers between companies. Lastly, the transition between unit level logistics system, S-4 module (ULLS-S4) and property book unit supply enhanced (PBUSE) adds another layer of property accountability.

R3 Costs

The 94th Engineer Battalion is not the first unit nor will it be the last to conduct R3 efforts simultaneously. The 94th will not be deployable for a while. The cost, monetary and time, of reestablishing all systems (operations, supply, motor pool, arms room, driver training, standing operating procedures, additional duties, and policy letters) is staggering—especially at reduced strength. Although Fort Leonard Wood and engineer leaders did their best to support the restationing on short notice, the battalion still operates out of temporary barracks, motor pools, arms rooms, and company headquarters. Dealing with new facilities and their shortages is a massive time and effort requirement for field grade officers and Soldiers alike. The process requires tactical patience. Each company has completed at least three 100 percent inventories in the last year, in addition to almost a 100 percent turnover of equipment in lateral transfers. Supply is the main effort and involves almost 30 percent of the time.

With the personnel changeover rate (see Figure 2), administrative systems must be solid. Leaders must factor and fight the extraordinary cost of untimely evaluations, late awards, inadequate sponsorships, delayed promotion boards and noncommissioned officer education system (NCOES) opportunities, and incorrect enlisted record briefs (ERBs). Most importantly, the stress and turbulence experienced is not directly measurable, but quite evident.

Conclusion

Leaders and Soldiers must embrace and plan for change. Leaders must maintain a positive attitude about change and highlight the advantages while mitigating the negative aspects. Our commander's three critical watch words successfully guided us through R3: *deliberate, disciplined,* and *focused.*

Captain Peterson is the company commander for Headquarters and Headquarters Company, 94th Engineer Battalion, Fort Leonard Wood, Missouri. He assumed command in Mosul, Iraq, in June 2005. He also served in Heidelberg, Germany; Baghdad, Iraq; Korea; Kosovo; and Fort Campbell, Kentucky.

CONSTRUCTION ENGINEERS:
COMMITTED TO MAKING A DIFFERENCE

By Captain Samuel Dallas Jr., First Lieutenant Jonathan E. Rushin, and Second Lieutenant Kevin W. Wooster

With the coordination, detailed rehearsals, and preparations completed, Alpha Company, 46th Engineer Battalion (Combat) (Heavy), was staged to support a maneuver commander. Just moments after its mission linkup was established, the synchronized fighting force of infantry, armor, and engineer Soldiers departed the comforts and relative safety of Camp Ramadi. As the element closed on its destination—the dilapidated remains of a water treatment plant located on the outskirts of Ramadi, Iraq—an explosive ordnance disposal (EOD) unit confirmed that the terrain was clear and free of improvised explosive devices (IEDs) and booby traps.

Does this sound like a situation from a training manual? Perhaps, for a task force habitually supported by mechanized or combat engineers—but for the members of a combat heavy construction company, trailing on the heels of a maneuver force remains a bit unorthodox.

The mission was to construct Combat Outpost (COP) Jazirah—the latest in a string of facilities that will sustain the increased presence of coalition forces and the Iraqi police that is curbing the ongoing violence on the city streets. COP Jazirah serves as an important step toward standing up the first police force in the Jazirah district of Ramadi (the most densely populated city in Al Anbar) since the fall of the Hussein regime.

Two weeks prior to this mission, the 1st and 2d Platoons of Alpha Company (vertical construction platoons) were on the leading edge of the battle with elements of the 1st Brigade, 1st Armored Division, as they conducted counterinsurgency operations in the heart of Ramadi. This joint, combined, and multicomponent decisive operation was significant in that it saw the incorporation of several Iraqi army company tank units actively engaged alongside U.S. forces. Outfitted in T-72 tanks, the Iraqi army certainly sent a message to all onlookers. Consideration for winning the hearts and minds of the people, an adage implemented many years earlier, was still factored into the mission plan. This provided some assurance that the people of Iraq were committed to changing their nation.

In essence, the mission for both vertical construction platoons was quite similar: construct life-support facilities,

A plume of smoke rises from the Jazirah Iraqi Police Station after an attack involving an SVBIED.

Soldiers from Alpha Company, 46th Engineer Battalion, construct the framework for guard positions.

survivability positions, and force protection features for the COP. With designs in hand, each platoon set out to construct facilities—which later would be handed over to the Iraqi army—for the maneuver commanders. Despite daily mortar attacks, material shortages, sniper fire, and delivery constraints, the Soldiers of Alpha Company completed their projects in less than eight days. Lessons learned from these projects proved vital to follow-on missions for the battalion and sister units. Minimizing time on the objective was an overwhelming theme from each platoon. A key solution for meeting this goal emanated from the junior enlisted: complete the majority of prefabrication work behind friendly lines.

Armed with hammers and power tools, 2d Platoon set out to do its part in supporting the mission. Under constant threat of insurgent attacks, the platoon focused on the tasks at hand and the mission intent: improve the safety and quality of life for coalition forces and the Iraqi police. COP Jazirah was brought to life quickly. The platoon ate, slept, and worked at the developing facility. In less than a week, the compound was ready for occupancy by a police force that was still being assembled.

For the Iraqi police, the completion of COP Jazirah improved the retention of police recruits. Complete with running water, electrical power, and air-conditioning, the facility was a step up in the quality of living conditions for the Iraqi occupants. Initial recruitment of police candidates was held at the facility, and the number of recruits was nearly double what the operational environment commander had hoped for. The facility provided the courageous citizens of the Jazirah district the opportunity to take back control of their city streets.

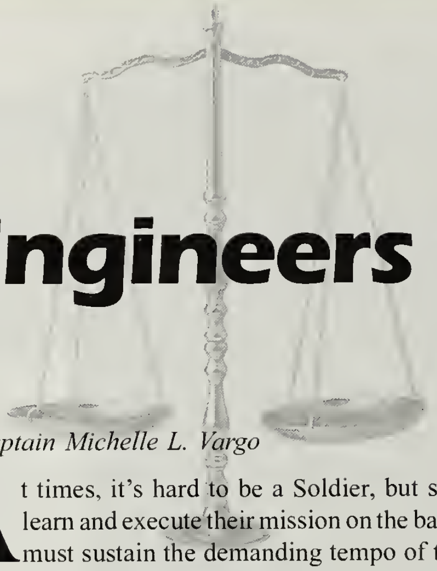
Through numerous construction missions, Alpha Company has become proficient at building bases and outposts that will withstand enemy attacks. Outfitted with hammers and power tools and a seemingly endless supply of missions, the company of construction engineers braved the most dangerous areas in Al Anbar Province to help improve the safety of coalition forces and the Iraqi police. Implementing ideas gained from after-action reviews and tactics, techniques, and procedures not only enabled the unit to receive maximum benefits for follow-on missions but also allowed the Soldiers of Alpha Company the opportunity to take on additional missions, sharpen critical skills, and provide enduring structures to maintain the Iraqi army and police in the region.

In 2006, the Jazirah Iraqi Police Station sustained a complex attack involving a suicide vehicle-borne improvised explosive device (SVBIED). All of the structures erected by Alpha Company survived the blast. For now enemy assaults will continue, but the police force in the Jazirah district of Ramadi is here to stay—their presence and safety secured by the work of Alpha Company, 46th Engineer Battalion.

Captain Dallas is the commander of Alpha Company, 46th Engineer Battalion. His previous assignments include instructor, drill sergeant, drill instructor, S-3 assistant, and platoon leader. He holds a bachelor's in business administration from Maryland University and a master's in public policy and administration from Webster University.

First Lieutenant Rushin is the battalion intelligence officer for the 46th Engineer Battalion. He was previously a platoon leader. He holds a bachelor's in biology from the Virginia Military Institute.

Second Lieutenant Wooster is the equipment platoon leader for Headquarters and Headquarters Company, 46th Engineer Battalion. He holds a bachelor's in international affairs from Georgia Institute of Technology and is a graduate of the Airborne School.



Engineers Maintain Balance in Iraq

By Captain Michelle L. Vargo

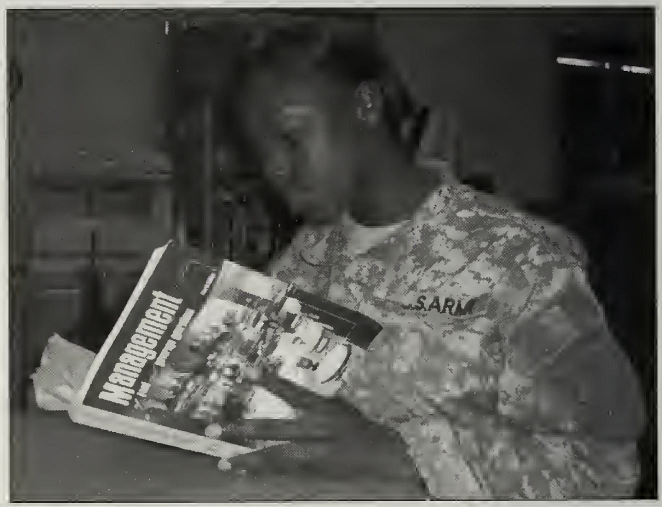
At times, it's hard to be a Soldier, but still they must learn and execute their mission on the battlefield. They must sustain the demanding tempo of today's Army, sharpness on the battlefield, and endurance for the long fight, all while preserving a sound lifestyle and balance in their personal lives.

Every branch of the military is working as a team to win the Global War on Terrorism. Leaders and Soldiers are developing their skills and are more technically and tactically proficient than ever before. Coalition forces are currently executing Operation Iraqi Freedom (05-07), which includes many Soldiers who are in Iraq for the second and third time. This time around, these Soldiers are taking advantage of many resources and gaining military knowledge.

Education

Many Soldiers are using their time off to continue formal studies or to learn something new. A battalion promotions clerk studies nightly; she is taking an eight-week course offered through Central Texas College and currently has 41 college credits toward her degree. An operations sergeant completed his associate's degree from Central Texas College while deployed.

Asian-Pacific Heritage Month included cultural dances.



A Soldier studies for a college class.

An assistant construction officer is learning Spanish through the Rosetta Stone Program, available on Army Knowledge Online (AKO). A great resource for any Soldier who wants to learn a language while deployed, AKO aids comprehension with lessons, pictures, questions, and tests.

In the interest of teaching others, a supply sergeant taught criminology classes twice a week. His course prepared Soldiers for their College Level Examination Program (CLEP) exam, and they hope to obtain a certificate of completion, which in some cases can be used toward a degree.

Led by excitement from the film release of *The Da Vinci Code*, a chaplain held a four-week study group on the historical accuracy of the book, with six Soldiers participating. Some read the book or planned to watch the movie and said that the study helped shed light on the intriguing mystery behind the plot.

Physical Fitness

While some Soldiers focus on education, others work on physical fitness. A majority of Soldiers are taking advantage of the yearlong time frame to become more fit. Several participated in biathlons

Soldiers perform leading roles in a theatrical production.

organized by Logistics Support Area (LSA) Anaconda's morale, welfare, and recreation office. Although initially apprehensive about participating in the dual event, all participants finished and vowed to try a biathlon again. In August, deployed Soldiers participated in the Relay for Life to raise money for the American Cancer Society. Soccer, basketball, and volleyball have also been team-building sports during the deployment.

Entertainment

On LSA Anaconda, many other opportunities are also available. For example, personnel took the opportunity to express themselves by playing lead roles in a play titled *Bugs, Brits, Builders, Strange Bed Fellows*. A 25-person team performed the theatrical production that lasted 2 1/2 hours, ran for two days, and drew a 250-person audience on opening night.

Other personnel celebrated Asian-Pacific Heritage Month by participating in cultural dances from Hawaii, Samoa, and New Zealand. There was a luau atmosphere and ethnic food that included a pig roast.

Summary

Even though their primary purpose is to support Operation Iraqi Freedom, Soldiers in Iraq also need to maintain personal balance. Exercising the mind through formal or informal classes, staying physically fit, and participating in cultural events can help lessen the stress experienced during deployments to areas of conflict.

Captain Vargo is the battalion civil engineer for the 84th Engineer Battalion (Combat). She has served three years in the 84th and has deployed twice in support of Operation Iraqi Freedom.

("Synergy," continued from page 6)

might not have reason to interact. Why not assign a military police E-8 as an engineer company first sergeant? Why couldn't a chemical lieutenant serve as the signal company executive officer? Build a new brand. Celebrate team accomplishments and organizational progress toward the common vision.

Synergy is only possible when everyone is involved and is forged by leaders who get 100 percent from every team member. Mergers and acquisitions almost universally come with baggage—suspicions and concerns generated by ignorance of the potential for the new team of teams. Barriers must be knocked down, stovepipes eliminated.

Leaders must model the behavior that values the contribution of every single team member. Identify excess capacity and determine how to make it available to those who are overtasked. Think of your organizational diversity as a strength. Find "outside the box" opportunities to create synergy.

Synergy is fueled by communication and crosstalk. Economies of scale and a better use of shared resources will not generally identify themselves. Leaders must constantly wire-brush the organization to bring these issues to the surface. Constant dialogue about best practices and lessons learned, coupled with teammates held accountable to one another, will drive growth across the board. The total can exceed the sum of the parts—many times over.

The leader's job is to create synergy; to add value; to make this combination of disparate units *better* than their former, independent state. If 1 + 1 + 1 = 3, that's not synergy. That result was achievable in the organization's formerly independent state, before the creation of the BSTB. Of what value is a battalion headquarters that shows no value added? Bigger is not better. Better is better. This kind of measurable growth does not occur by itself. Nope…true synergy demands good, old-fashioned, "roll your sleeves up and make it happen" leadership.

Colonel Magness is an Army War College fellow at the University of Texas. Previously, he served as an observer-controller at the National Training Center (NTC) at Fort Irwin, California.

The opinions expressed in this article are those of the author and do not necessarily reflect the official policy or positions of NTC, the Army, the Department of Defense, or the U.S. government.

SURVIVABILITY PLANNING AS A STAFF PROCESS

By Major Andrew N. Liffring

Traditional survivability operations often involved an M9 armored combat earthmover (ACE) or a D7 dozer constructing multiple one-tier or two-tier fighting positions for mechanized forces and a small emplacement excavator (SEE) digging individual fighting positions for dismounted infantry. Because the threat has changed in the Global War on Terrorism, engineers must provide survivability positions that protect Soldiers from new threats. In recent years, units reduced the lethal effects of vehicle-borne improvised explosive devices (VBIEDs), direct-fire engagements, and sporadic mortar fire by constructing guard towers, bunkers, and entry control points. These survivability positions have increased the force protection posture of our force and reduced the rate at which the enemy is draining combat power, but is it enough?

According to the Department of Defense, more than 2,800 American Soldiers have been killed in Iraq and more than 21,000 have been wounded since the beginning of the war.[1] To reverse this trend, units should develop comprehensive force protection plans. Developing a survivability plan is a staff process that requires input from the S-2, engineer coordinator, fire support officer, S-3, and S-4 and begins with evaluating the threat, setting priorities, and synchronizing resources to ensure that the right resources are requested and delivered in an efficient manner.

Evaluate the Threat

Traditionally, units have been successful at planning survivability operations when the enemy consists of a large mechanized force. Units determined the number of two-tier M1/M2 positions that could be built in a given time by using the engineer battlefield assessment. Units then used tools such as a commander's card and a survivability matrix to track the status of these positions and reallocated resources as necessary to ensure that the plan was completed.

Today, the enemy is freethinking and uses its strengths against a unit's weaknesses. The enemy targets units that generally have low force protection measures—units that are static and predictable in their activities, lightly armored, or not well armed are vulnerable to attack. To increase its chances of success, the enemy conducts limited raids, ambushes, improvised explosive device (IED) attacks, VBIED attacks, and sporadic mortar attacks to inflict casualties, disrupt logistical operations, and force units to commit combat power to protect supply lines, thus allowing the enemy unrestricted movement in the population centers to further destabilize the local government.

To protect the force from these attacks, the engineer coordinator must work closely with the S-2 to determine what types of weapon systems the enemy may use to attack, and then design survivability positions that offer protection against those weapon systems. If the S-2 predicts that the enemy will raid a guard tower on a forward operating base (FOB) perimeter with AK-47s, RPK machine guns, and rocket-propelled grenades, then the engineer coordinator should update the survivability plan to include an upgrade to the guard tower in order to meet the threat. If the S-2 templates a mortar attack on the FOB, then the engineer coordinator should include plans to build enough bunkers to protect the population of the FOB and design those bunkers to defeat a mortar. Field Manual (FM) 3-06.11, *Combined Arms Operations in Urban Terrain*, and FM 5-103, *Survivability Operations*, contain valuable data that should be consulted when designing specific survivability structures.

Set Priorities

Once survivability tasks are identified, they should be consolidated and prioritized. This prevents subordinate commands from competing for the same resources to complete the same projects. The engineer coordinator sets priorities by determining the greatest threat to the formation and then develops a survivability matrix showing the length of time each subordinate unit would receive survivability assets. The same process can to be done while fighting in the contemporary operating environment. The priority of survivability assets should be linked to the unit's most vulnerable sites, and a survivability matrix should be created to show subordinate commands the time, activity, and location of critical survivability assets.

Synchronize Resources

Synchronizing resources is one of the most difficult tasks in executing a survivability plan. Merriam Webster's® online dictionary defines *synchronize* as "to represent or arrange (events) to indicate coincidence or coexistence."[2] Materials, equipment, and labor should be arranged so that each support the execution of the survivability plan. Project management meetings attended by all parties involved—to verify work schedules and resource requirements—ensure that the project is completed on time, issues are addressed quickly, and communication is maintained. Ultimately, the goal is to provide Soldiers with the necessary protection to prevent the enemy from developing and executing plans against unprotected assets.

Conclusion

To help protect Soldiers from our enemies, units need to develop survivability plans by evaluating the threat, setting priorities, and synchronizing resources. These simple steps are essential in developing plans that are executable and that allow our forces to gain the advantage against our enemies.

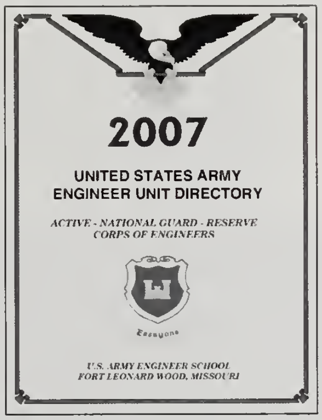
It is essential that leaders are involved in the process. They must continuously inspect positions occupied by Soldiers to ensure that revetments, stringers, and sandbags are adequate, correctly placed, and do not show signs of structural failure. Staff officers and the leaders on the ground can make a big difference in increasing our force protection stature and decreasing casualties in-theater.

Major Liffring is assigned to Task Force Sinai, Fort Bragg, North Carolina, as the facilities engineer. He previously served as an observer-controller at the National Training Center at Fort Irwin, California; commander of Alpha Company, 37th Engineer Battalion (Combat) (Airborne), Fort Bragg, North Carolina; executive officer, 10th Engineer Battalion, Fort Stewart, Georgia; and platoon leader, 82d Engineer Company (Combat Support Equipment), Camp Edwards, Korea. He holds a bachelor's in mining engineering from the Colorado School of Mines and a master's in business administration from Norwich University.

Endnotes

[1] *Iraq Coalition Casualty Count, <http://icasualties.org/oif/>, accessed on 28 November 2006.*

[2] *Merriam-Webster Online, <http://www.m-w.com/dictionary/synchronize>, accessed on 28 November 2006.*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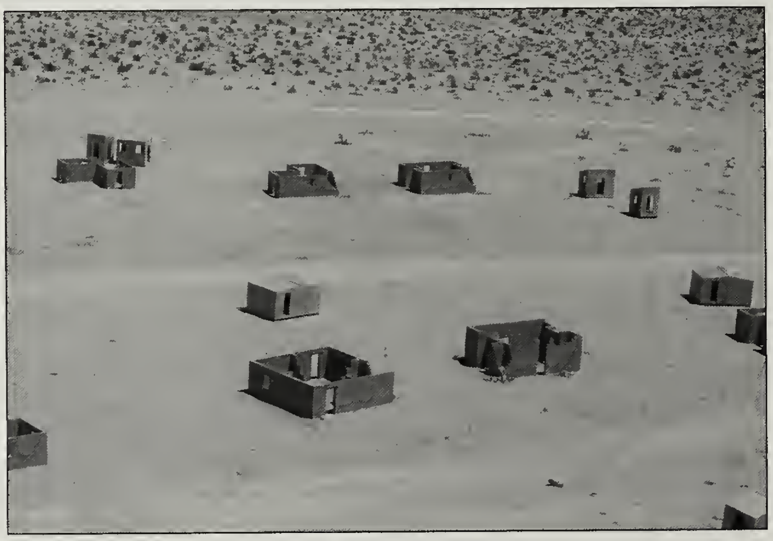
2007 Engineer Unit Directory

The 2007 United States Army Engineer Unit Directory is available online in Adobe PDF format at <*http://www.wood.army.mil/engrmag/Engr%20Unit%20Dir/2007Directoryonline.pdf*>. Take a moment and see if your unit's listing is correct. Changes to the Unit Directory can be made by calling (573) 563-7644 or e-mailing <*engineer@wood.army.mil*>.

Reserve Engineers Lead the Way for Urban Operation Construction at NTC

By Master Sergeant Tony A. Knecht

Reserve engineer units are helping make changes to the training facilities at the National Training Center (NTC), Fort Irwin, California. Operation Sand Castle, a coordinated effort between the NTC G-3 office and the United States Army Reserve Command (USARC), completed its second year of construction efforts, and Reserve participation is expected for another eight years. The mission is to provide upgrades to NTC training facilities and existing urban operation cities and to complete a new urban operation city—known as Tiefort City—consisting of 300 to 500 buildings. The new city will create a premiere training area for an entire brigade combat team (BCT).



Aerial view of Tiefort City

Operation Sand Castle

The 412th Engineer Command is the exercise executive agent responsible for the planning, logistics, and training of all participating units. The Exercise Support Command, the Reserve liaison office at Fort Irwin, provides assistance to the 412th. Operation Sand Castle provides Reserve engineer Soldiers the opportunity to train on many technical and tactical skills in a desert environment.

First Year

Many improvements were made to existing training facilities downrange—also known as the "box"—during Operation Sand Castle 2005. The exercise was conducted over two rotations, with the 411th Engineer Brigade (Combat) providing command and control for participating units. The 389th Engineer Battalion (Combat) (Heavy) served as task force commander during the first rotation, and the 365th Engineer Battalion (Combat) (Heavy) and the 854th Engineer Battalion (Combat) (Heavy) shared responsibilities during the second rotation. Other units participating included the 319th Engineer Company, the 770th Engineer Company, the 952d Engineer Company (Combat Support Equipment), the 328th Engineer Company, the 425th Engineer Company, and the 673d Facility Engineer Detachment.

Units installed siding on the Langford Well complex and built windows, doors, and new structures in five different urban operation cities, making them look more like structures in-theater. Horizontal construction included creating a bypass road around Langford Lake—vastly improving the main supply route and enabling easier transportation of equipment, supplies, and personnel to forward operating bases (FOBs)—and constructing roads and drainage around Eastland City. Improvements to the old quarry site located on Tiefort Mountain included tripling its size, building a wooden headwall structure, and setting up a rock-crushing plant that produced all of the gravel for Operation Sand Castle 2006. Improvements were not limited to the "box"; plumbing services were provided to some of the facilities in the cantonment area, improving quality of life in those buildings.

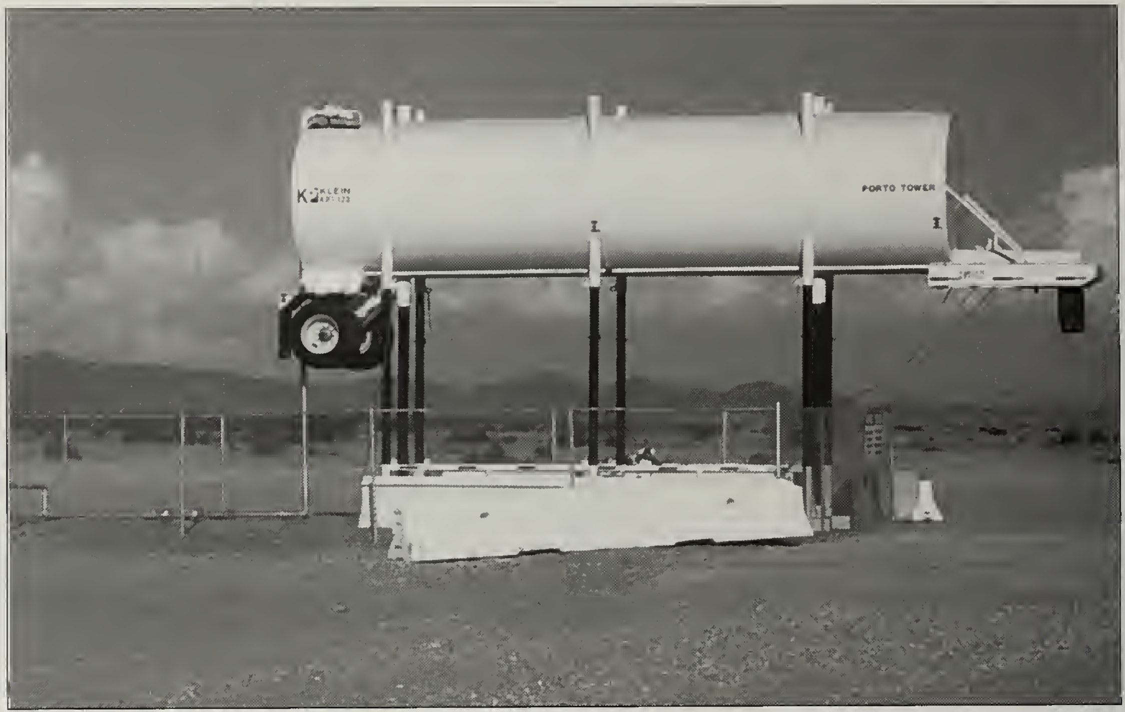
Tiefort City road network

Second Year

Operation Sand Castle 2006 broke ground on the beginning stages of the new Tiefort City site. The 372d Engineer Group (Combat) was responsible for command and control over participating units. The 673d, working with the United States Army Corps of Engineers®, provided construction designs and data. The 733d Facility Engineer Detachment began working on the project designs for fiscal year 2007. The Construction Management Section, 411th Engineer Brigade, provided quality assurance during all construction phases. The Soldiers lived in FOB Santa Fe during their rotations, and the 137th Quartermaster Company provided laundry and shower support throughout the exercise. The first rotation consisted of Soldiers from the 368th Engineer Battalion (Combat) (Heavy), the 961st Engineer Battalion (Combat) (Heavy), the 321st Engineer Battalion (Combat) (Mechanized), the 728th Engineer Detachment, and the 718th Engineer Company (Combat Support Equipment). The second rotation consisted of Soldiers from the 863d Engineer Battalion (Combat) (Heavy), the 841st Engineer Battalion (Combat) (Mechanized), and the 285th Engineer Company (Combat Support Equipment).

Two 48- by 60-foot pre-engineered buildings, one 24- by 36-foot pre-engineered building, ten concrete masonry units, and thirteen skid-mounted modular wooden buildings were

Quarry site where gravel is produced for NTC construction projects



Capital City well site

completed. More than 2.85 miles of slum, residential, and interstate road network with drainage ditches were constructed, providing city infrastructure. One of the more challenging projects was upgrading a well stem drilled the previous year: a 16- by 70-foot discharge pad with 10-foot approach ramps was constructed, plumbing was installed, a 12,000-gallon storage tank and perimeter fence was erected, and an electrical box with service provided by a 10-kilowatt generator was installed. The 319th returned to NTC and produced gravel for the construction projects. With help from the 368th, 863d, and 841st, more than 18,000 tons of gravel were produced.

Tactical Training

In addition to the construction projects, Soldiers were able to receive tactical training on many of their mission-essential tasks. Operating out of an FOB environment, Soldiers had to cover entry control points, establish base camp operations, prepare quick-reaction forces, and conduct perimeter guard duties. One of the tougher jobs in the FOB was that of the mayor, who had the overall responsibility of security and all quality-of-life issues. Soldiers practiced many tactics, techniques, and procedures throughout the exercise and performed tasks such as jobsite security, improvised explosive device (IED) detection, IED reaction, route clearance, convoy procedures, convoy safety briefs, trip tickets, risk management, reacting to contact, operating a net control station, operating a retransmission site, reporting procedures, and warrior task training. Units were able to take advantage of M16, M203, M249, M9, M2, MK19, shotgun, mine-clearing line charge (MICLIC), and demolition ranges. Currently, an average of one unit each year fires on the convoy live-fire range. Units received feedback from observer-controller/trainers (OC/Ts) from the 2-310th Training Support Battalion and 1-347th Training Support Battalion. The OC/Ts worked closely with the Operations Group Divisional Tactical Operations Center (DTOC) and the engineer Sidewinder element on Fort Irwin. All leaders and Soldiers learned valuable lessons during their time at NTC. Training tactically and technically in a desert environment was challenging and realistic, incorporating many of the principles found in Army Field Manual 7-1, *Battle Focused Training*.

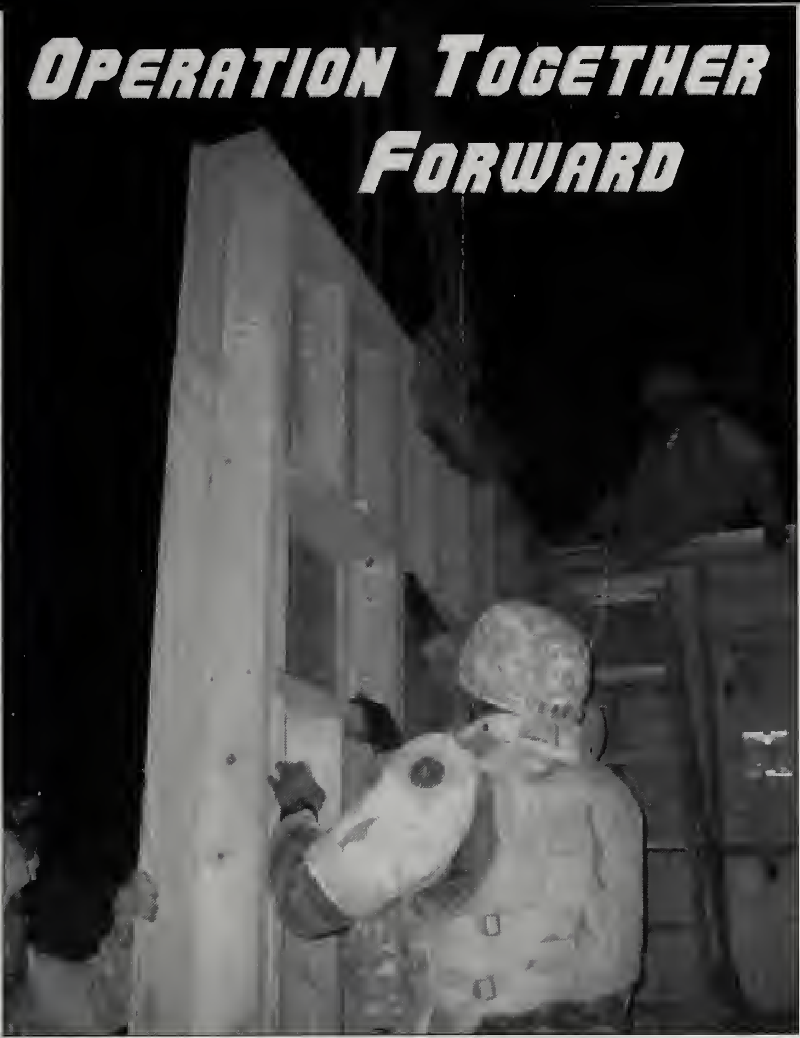
Future Exercises

An equipment pool was acquired and established from six different regional readiness commands from all over the United States and is stored for future Operation Sand Castle exercises at a new equipment concentration site in California. Units supplemented additional equipment needs by shipping their home station equipment. Maintenance and logistical operations were successful, overcoming the many challenges presented by the terrain and harsh desert environment.

Participating engineer units are setting up the foundation to improve future training events at the nation's premier training center. The new Tiefort City will support all armed services that conduct training at NTC. Future units will have a bigger, more complex training facility, which will enhance unit training and deployment preparation. Overall, the exercise was a rewarding and educational experience that will benefit leaders, Soldiers, and units for many years.

Master Sergeant Knecht is the Reserve Component liaison at the Exercise Support Command at NTC, Fort Irwin, California. Previous assignments include 952d Engineer Company (CSE), Paris, Texas; Detachment 1, 952d Engineer Company, Marshall, Texas; Military District of Washington (MDW) Engineer Company, Fort Belvoir, Virginia; 84th Engineer Battalion, Schofield Barracks, Hawaii; 4th Engineer Battalion, Fort Carson, Colorado; and 44th Engineer Battalion, Camp Nimble, Korea.

OPERATION TOGETHER FORWARD



By First Lieutenant Kurtis J. Schaaf
and First Lieutenant Michael P. Casey

With increasing violence in Baghdad, traffic flow needed to be regulated between the various areas of the city. Members of Headquarters and Support Company, Bravo Company, and Charlie Company, of the 84th Engineer Battalion (Combat) (Heavy), were attached to the 62d Engineer Battalion (Combat) (Heavy), from the 4th Infantry Division, to help with the mission. A convoy through Baghdad brought them to Forward Operating Base Loyalty to conduct Operation Together Forward.

A Soldier ensures that the building floor is level.

In three weeks, the engineers constructed vehicle checkpoints on bridges and pedestrian checkpoints along walkways over the canal. Soldiers used cranes, loaders, and excavators to emplace concrete barriers, bunkers, and barbed wire to control traffic flow. While conducting these missions, the Soldiers were subjected to numerous mortar attacks and minor direct-fire incidents; fortunately, they suffered no casualties.

Upon return to the Victory Base Complex, engineers from the 84th were once again attached to the 62d for Operation Baghdad Security Belt. This operation consisted of blocking positions and checkpoints around the city to control traffic flow from areas such as Fallujah, Ramadi, and Mosul. Operating for extremely long hours, teams from the 84th emplaced blocking positions and checkpoints all around the city.

The checkpoints required a logistics support area because the police officers manned the checkpoints 24 hours a day. As part of the operation, buildings were built and placed at traffic control points to support the Iraqi police. Soldiers from Charlie Company emplaced the buildings in less than two hours, getting the mission completed quickly and efficiently.

The engineer support led by the 84th Engineer Battalion, in conjunction with the 62d Engineer Battalion and Iraqi security forces, allowed the timely completion of the Baghdad Security Belt. Operation Together Forward is just one of the many ways coalition forces strive to make a difference for the Iraqi people.

First Lieutenant Schaaf is the platoon leader for 2d Platoon, Charlie Company, 84th Engineer Battalion. He is a graduate of the University of Nebraska.

First Lieutenant Casey is the platoon leader for the Earthmoving Platoon, Charlie Company, 84th Engineer Battalion. He is a graduate of the United States Military Academy.

Marine Combat Engineers
Repair Iraq's Roadways

By Corporal Stephen Holt

The sound of a cement mixer breaks the silence in the darkness on a lone Iraqi road near the city of Fallujah. Marine combat engineers are working in what is known as a "blackout" condition—no light other than the moon and the occasional glimmer of a flashlight. It's early morning, and the Iraqi sun will soon be rising.

This is the time of day when many Americans get up for work, but the combat engineers have already put in an 8-hour day. The Marines of Charlie Company, commonly referred to as "Hell-Bent Charlie," of Combat Logistics Battalion 5, are hard at work repairing the roads that intersect the city and countryside of Fallujah.

Repairing Iraqi streets isn't quite like repaving a road in the United States. Instead of fluorescent orange vests and hard hats, Marine combat engineers carry rifles with optic sights and wear combat gear consisting of a protective vest, helmet, and ammunition—for a combined weight of more than 50 pounds. These roads, which are traveled by Iraqi citizens along with coalition and Iraqi security forces, are constantly damaged by roadside bomb attacks, and fixing them is crucial to the movement of supplies and troops in the area. In addition, the work is helping to rebuild the Iraqi infrastructure.

The night repair mission begins right after dusk with a quick meeting to discuss the mission and the latest intelligence findings. Last-minute gear checks are conducted before leaving the security of Camp Fallujah. Charlie Company goes straight to work, quickly filling two holes as soon as it leaves the confines of the camp.

Soon the company encounters the very threat it is trying to fight—an improvised explosive device (IED). Security is set up, and the explosive ordnance disposal team is called. The potentially deadly device is neutralized in minutes, and the Marine road workers press on. These roadside bombs are a favored weapon used by the enemy to wreak havoc on coalition forces. The threat of IEDs is one of the main reasons these Marines are on the road. The roads, which have fallen into disrepair over the years, are a favorite place for insurgents to place IEDs.

Various teams within the company have specific jobs and responsibilities. The teams may be tasked to provide security,

Left: A Marine shovels dirt from the back of a dump truck during a route repair mission.

Below: Freshly mixed concrete is poured into a crater created by an IED.

survey a crater to make sure it is safe to repair, or conduct the actual repair. For the craters to be repaved efficiently, these teams must work together while performing their individual tasks. The Marines have to work fast to avoid being a target of insurgents and still perform their job with precision. Many of these missions have been subject to deadly sniper and mortar attacks.

Surveying is the first step to repairing a road. Many factors must be calculated to properly repair a crater—size of the hole, depth of the hole, and time needed on-site. For a crater to be filled properly, dirt is molded into a foundation and then cement is poured in. After smoothing off the top of the quick-drying road patch, Charlie Company searches for the next area in need of repair.

Working with hundreds of pounds of concrete mix and dirt, in temperatures well above 100 degrees during the day, is a physically demanding job for these Marine combat engineers. But the results of their efforts are evident every time a convoy travels a road that has been made safer by their work.

Corporal Holt was temporarily assigned to Camp Taqaddum, Iraq, as a combat correspondent. His duty station is Camp Pendleton, California.

Blue Hole Project

By First Lieutenant Trent D. Geisler

The Blue Hole is one of Santa Rosa, New Mexico's, greatest natural resources and a geological wonder. It has a water depth of approximately 81 feet, and the water temperature stays at a constant 61 degrees Fahrenheit. An artesian spring from an underground source supplies water at a rate of more than 3,000 gallons per minute, and this rate of water flow creates a large amount of natural erosion as rock and soil are loosened and fall to the bottom. Along with the natural erosion, a former Santa Rosa city administrator ordered rock and debris dropped in the Blue Hole to close off the opening to the cavern system located at the bottom. This decision was partly to discourage divers from attempting to navigate the caverns, because many would run out of air or become lost and disoriented and were unable to find their way back.

Divers prepare to perform in-water checks before leaving the surface.

The massive amounts of debris, both natural and man-placed, cut off the artesian water flow into the Blue Hole. But the debris could not stop the flow for long—the water found new ways of pouring into the hole. The water soon forced its way in from the sidewalls, causing an even greater amount of erosion. This new erosion from the sidewalls deteriorated the hole's stability, and it was placed in an emergency state of repair.

Twenty years after the initial decision to fill in the hole, the United States Army Corps of Engineers® Albuquerque District called on Army divers to remove the rock and silt that clogged this natural wonder. In late Spring 2006, 23 members of the 74th, 86th, 511th Engineer Light Diving Teams and the 569th Engineer Dive Team from Fort Eustis, Virginia, deployed to Santa Rosa to conduct dredging operations.

The plan to remove the debris called for three techniques: manual labor, a hydraulic submersible pump system, and an

A crane lifts a basket of rock and debris from the bottom of the Blue Hole.

airlift system. The manual labor technique involved the strongest divers picking up the larger rocks and placing them into a basket. The second technique consisted of a hydraulic submersible pump suspended approximately 40 feet in the water column with intake hoses extending all the way to the silt bottom. Divers would call for "switch on," and the pump would suck a silt and water mixture at a rate of 800 gallons per minute. The third technique was a basic airlift consisting of an 8-inch hose that pumped out small gravel and rock. Air was supplied to the hose at a pressure of 110 pounds per square inch, resulting in a flow of more than 1,000 gallons per minute.

Tenders, who provide surface support, pull the divers from the water.

Each method was very productive because the divers worked all three techniques at the same time. The dive plan called for three divers to dive to a depth of approximately 81 feet for 90 to 100 minutes. At an altitude of more than 4,600 feet, the equivalent diving depth is 100 to 110 feet, and the decompression schedules were modified accordingly. Using surface decompression, the divers spent anywhere from 38 to 51 minutes in the hyperbaric recompression chamber, breathing 100 percent oxygen to reduce the amount of time needed to off-gas the residual nitrogen left in the body.

Due to the dive plan using surface decompression schedules, the divers were able to complete more than eight hours of underwater work each day, which resulted in more than 100 cubic yards of rock and more than 120 cubic yards of silt being removed after 21 diving days. The mayor of Santa Rosa and the Corps of Engineers were extremely pleased with the Army divers' efforts—they worked longer, harder, and more efficiently than any commercial dive company hired in years past. The divers' hard work and dedication to the mission assured future training opportunities at the Blue Hole in the years to come.

First Lieutenant Geisler is the team leader of the 74th Engineer Dive Team (Light) at Fort Eustis, Virginia. He is a graduate of the United States Military Academy.

Army Divers

Conduct a Pier Rehabilitation Mission

By First Lieutenant Timothy M. Mitroka

In July 2006, fifteen divers from the 86th Engineer Team (Dive) traveled to Jersey City, New Jersey, to conduct a mission for the United States Army Corps of Engineers® New York District. The team spent three weeks rehabilitating the docking piers and quay walls at the Caven Point Marine Terminal where numerous Corps vessels—that travel through New York and New Jersey waterways collecting or salvaging debris or wreckage and conducting surveys—are docked.

The mission focus was replacing 98 damaged cross brace support boards under the piers. The average size of the boards was 8 feet long by 3 inches thick by 10 inches wide. The removal process consisted of divers in the water using an underwater hydraulic impact wrench to loosen and remove hardware, which was usually covered with barnacles and rust. Once freed, a line was tied around the board and a team on the surface lifted it out of the water. Because some of the hardware was corroded, an underwater hydraulic grinding

A dive supervisor inspects a surface-supplied diving helmet before deploying a diver into the water to remove debris from under a boat lift.

One diver uses a hydraulic impact wrench to tighten a board in place while another holds the hardware in place from the other side.

tool or cutting torch was used to cut boards free. Once the boards were removed and on the surface, another team cut and drilled holes in new boards to match the old ones. The new boards were attached using new hardware to keep them in place for the next few years.

A hydraulic grinder is used to cut off rusted bolts before removing a support board.

Other tasks included replacing a 40-foot wooden bumper. The bumper is replaced annually because it functions as a pivot point on a quay wall for one of the larger vessels. In a year's time, the bumper becomes severely chipped, and the bolts securing it in place begin to protrude and scrape up against the vessel when it's docked. The team used a small crane to recover a submerged 90-foot section of a horizontal brace that broke off from its support piles. Using the crane, the team repositioned this large section and secured it so it would not break off again. Divers, using their surface-supplied diving gear, sprayed out debris from underneath the boat lift. The team also installed a buoy 75 feet out from one of the terminal's quay walls to warn off boat traffic from a shallow area that's piled with rubble from an old demolished building.

The mission was a success, and the repairs significantly increased the structural integrity of the piers and quay walls. This pier rehabilitation mission has been an annual mission for the past few years, and the team always looks forward to working with Caven Point Marine Terminal. Not only does it provide an opportunity for the Soldiers to train and increase their proficiency in using underwater hydraulic tools, but they are able to conduct small-scale underwater construction operations as well.

First Lieutenant Mitroka is the platoon leader for the 86th Engineer Team (Dive). He was previously assigned to Delta Company, 577th Engineer Battalion. He is a graduate of the United States Military Academy.

Photo by Robert H. McElroy

Pohakuloa Training Area Celebrates 50 Years of Service to the Military

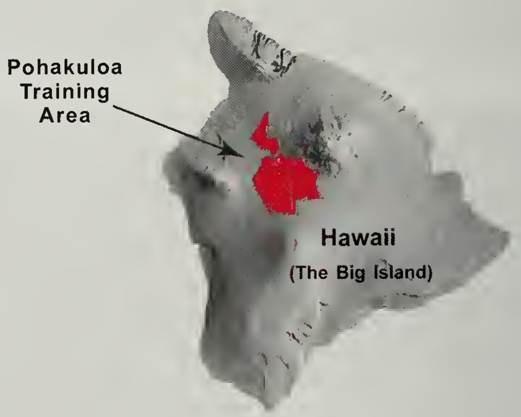
By Mr. Robert H. McElroy

Recently, Pohakuloa Training Area (PTA), on the Big Island of Hawaii, celebrated 50 years of service as the prime military training area in the Pacific Region. First used as a Marine Corps artillery base during World War II, the 133,000-acre PTA came under Army control following the war. In the mid-1950s, Oahu-based Soldiers built the Quonset huts that have become the post's signature building.

Over the years, PTA has hosted units from every American military service, as well as military personnel from allied nations and other federal agencies. The post's numerous training ranges, impact area, and remote location make PTA an ideal place for up to battalion-size units to train.

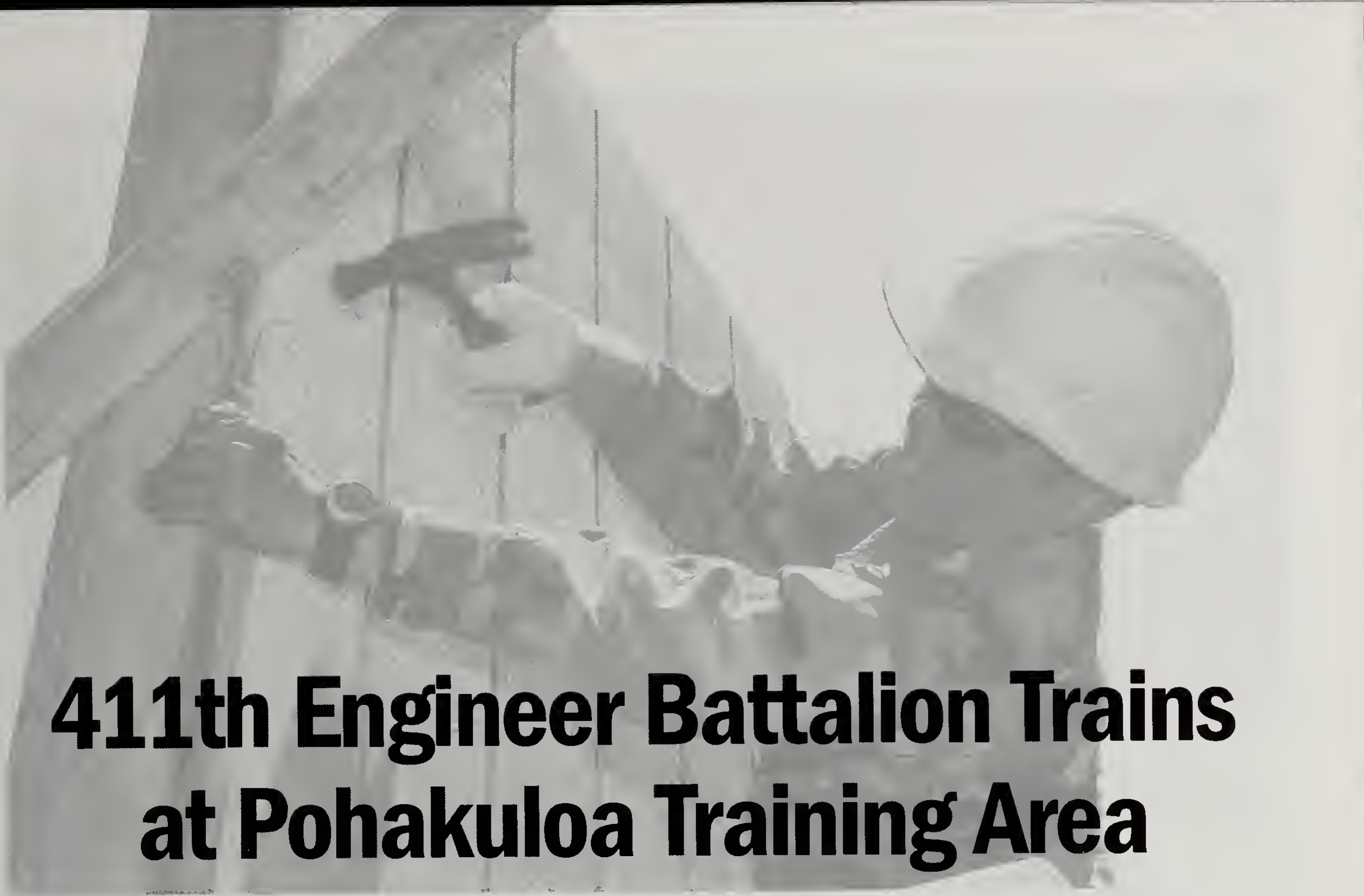
Although the military has changed dramatically over the last 50 years, the mission of PTA has not changed—to support and sustain (the warfighter) military training. But even though we are a nation at war, it is also important to balance the training mission with protecting the environment. To that end, Hawaii has dedicated personnel and resources to ensure that its more than 300 sensitive cultural resources are here for generations to come. Balancing the training requirements of the military while promoting environmental sustainability practices is a top priority for the Army Installation Management Agency.

As the Army transforms and Stryker brigade combat teams take their place in the way the Army fights, PTA will likely become even more important. Some consider PTA the third most significant Stryker training facility—behind Fort Irwin, California, and Fort Polk, Louisiana—and a linchpin in future Stryker training. The Army is investing millions of dollars in PTA because of its strategic importance to the future of the Army and other military services in Hawaii and the Pacific.



A commemorative service was held at PTA to mark the 50th anniversary, which included the blessing and unveiling of a pohaku or stone, as well as recognition of all the Soldiers, Marines, Airmen, and Sailors who have trained and worked at PTA over the last half century.

Mr. McElroy was the Pohakuloa Training Area Public Affairs Officer at the time this article was written. He is now the Public Affairs Officer for the United States Army Area III Support Activity, Camp Humphreys, Korea.



411th Engineer Battalion Trains at Pohakuloa Training Area

By Mr. Robert H. McElroy

Alpha Company, 411th Engineer Battalion (United States Army Reserve), recently completed its annual training rotation at Pohakuloa Training Area (PTA), on the Big Island of Hawaii. (See article on page 26.) The training was especially important because it had been more than a year since the company had been together for longer than a weekend drill, and half of the Soldiers—to include the company commander—were new to the unit.

The commander's goals for the annual training were to qualify Soldiers on individual and crew-served weapons and conduct individual skills training and combat lifesaver training. Once those tasks were completed, his focus became training Soldiers on sustainable military occupational specialty (MOS) skills for engineers.

Since there were approximately 35 new Soldiers in the unit from the rank of private to specialist, it was necessary for the experienced noncommissioned officers (NCOs) to teach the new Soldiers. Since many of the NCOs had operated heavy equipment in Iraq, they could teach the young Soldiers how to operate it safely—always a major concern during training.

When the Soldiers had completed weapons qualification and combat lifesaver training, they turned their attention to several engineer projects for PTA that would test the skills of both the company's vertical and horizontal platoons. The Horizontal Platoon focused on improving selected roads and ranges. At the site of PTA's new Known-Distance Range, engineer Soldiers graded the ground and laid crushed rock

Soldiers from Alpha Company, 411th Engineer Battalion, construct a range house/observation tower during their annual training.

A load of freshly-crushed rock is dumped on a new road being built at Pohakuloa Training Area.

along the road. They repeated the same task at the site of one of the forward operating bases (FOBs) in the training area. The Vertical Platoon spent its time building a new structure in the training area and renovating older ones in the cantonment area.

At Pu'u Ahi, deep in the training area, engineer carpenters built a combination range house and observation tower for use by Army aviation attack-helicopter units. And on PTA's cantonment area where the troop billets and support facilities are, the engineers renovated a Quonset hut containing billets and a shower for female Soldiers.

The skills the new engineer Soldiers gained during their annual training will help them greatly the next time the 411th deploys. When the unit deployed to Iraq, it was attached to the 1st Cavalry Division from Fort Hood, Texas, and completed several carpentry and construction projects.

Despite the company's focus on unit and individual training and construction projects, some Soldiers found time to visit students at Keaau Middle School, on the east side of the Big Island. Alpha Company Soldiers joined PTA Soldiers in handing out dictionaries and other school supplies to the students.

For one staff sergeant, annual training was all about leaving something behind: the knowledge he imparted to his young charges and the range house they built together.

Mr. McElroy was the Pohakuloa Training Area Public Affairs Officer at the time this article was written. He is now the Public Affairs Officer for the United States Army Area III Support Activity, Camp Humphreys, Korea.

Photos by Robert H. McElroy.

News and Notes

412th Engineer Command Assumes Command of the 926th Engineer Group. Approved by the United States Army Reserve Command (USARC), the 412th Engineer Command, located in Vicksburg, Mississippi, assumed command of the 926th Engineer Group, headquartered in Montgomery, Alabama. The signed memorandum from the USARC Chief of Staff paved the way for the 412th to provide command and control support to 5,000 Soldiers in a geographic area spanning from West Virginia to Florida and west to Kentucky. This was the first time the unit has had a downtrace since 1974.

First in a series of realignments, this move is part of the Army Reserve's transformation, called the Army Reserve Command and Control (ARC2). Within the next two years, the 412th will have a total downtrace of more than 11,000 Army Reserve Soldiers in an area that spans from Maine to Florida and extends west to Kentucky.

Transforming the 412th's structure to support thousands of Army Reserve Soldiers—while transforming the warfighting mission to better support the United States Army Corps of Engineers® and the Army's transformation and simultaneously fulfilling existing global missions—will be complex. Fortunately, according to the 412th commander, our exceptional Soldiers and civilian employees, supported by well-prepared families and understanding employers, are ready for the task.

The 412th provides wartime support in plans and exercises to the United States European Command and the United States Forces Korea and maintains three forward detachments in Germany, Hawaii, and Korea. Under ARC2, the 412th will also provide training and readiness oversight to units and Soldiers under three subordinate brigades, while still maintaining go-to-war missions worldwide.

In addition to major regional contingencies, the 412th continues its current mission of worldwide support to the Global War on Terrorism with more than 70 Soldiers deployed around the globe. The challenges of transforming while at war, while increasing the mission load, are all part of the 412th's mission of providing responsive, superior engineer support anywhere in the world. The unit stands ready to undertake the challenge.

The point of contact is Carol Coleman at (601) 631-6102 or <*carol.coleman2@us.army.mil*>.

SUMMER TRAINING AT THE UNITED STATES MILITARY ACADEMY

By Captain Ryan J. Morgan

The Department of Military Instruction mission at the United States Military Academy states that it will *"train, educate, and inspire cadets in the essence of Warfighting and the Profession of Arms...in order to develop competent future Army officers."* Until recently, that mission was accomplished by using a Cold War model for training, but that has now changed.

Cadet Field Training

Cadets enter the academy as civilians, but in two years they leave as small-unit leaders. In their second year, they attend cadet field training (CFT), which follows the crawl-walk-run method and consists of two 4-week details. These details are led by two separate chains of command.

Pre-2006 Training

The first detail—crawl-walk—focuses on individual training. Some of the training covered includes land navigation, basic and advanced rifle marksmanship, patrolling, combatives, and first aid.

The second detail—run—focuses on collective and leader training. Up until the summer of 2006, the second detail—known as Operation Highland Warrior—included training on offense, defense, raid, reconnaissance, and ambush. These were separate events that took on a Ranger School focus of operating in the woods and away from built-up areas. The training was useful, but not as relevant as it needed to be since the Global War on Terrorism began. The academy realized this and made a radical change.

2006 Training

The change was not a slow, multiple-year process; in about two months, the new plan was instituted and the planning and resourcing started. The new training for CFT still follows the crawl-walk-run model; however, the run detail now looks more like a sprint. All of the training during the first detail now directly supports the second detail. Camp Buckner was

A cadet speaks with a villager during training.

transformed into a forward operating base (FOB) with access control points at the gates. Cadets implement a complete weapons immersion program, and training is a continuous operation where all committees interact with each other. A committee consists of West Point staff and supporting Soldiers that plan and resource the different blocks of training and evaluate cadets as they execute their training. The new committees for Operation Highland Warrior are access control point defense, search and attack, convoy reaction, cordon and search, squad live-fire ambush, and quick-reaction-force operations. Arabic linguists were hired by the academy to provide not only a language barrier but also the ability to interact with the Muslim religion and culture.

Access Control Point Defense. Access control points are an opportunity for cadets to be exposed to the difficulties of defending a fixed site and making difficult tactical, ethical, and cultural decisions at a high-visibility location—the front gate of an American compound. Cadets are trained and evaluated in the actual setup and execution of an access control point by conducting vehicle and personnel searches. However, they are further challenged when the enemy tries to infiltrate the access control point using a variety of methods. Each of the situations requires the cadets, in all positions, to make tough decision on the spot.

Search and Attack. Search and attack, which is traditional patrolling training, teaches the future lieutenants the principles of combat patrol—critical to current operations in many theaters of operation. This mission centers on FOB security by conducting combat patrols in the surrounding hills looking for enemy mortars and caches.

Convoy Reaction. Soldiers conduct convoy operations on a daily basis in Operation Iraqi Freedom, and this led to the development of a convoy reaction mission. This mission focuses on executing a convoy, conducting react-to-contact drills, training cadets on route clearance and resupply missions, and reacting to improvised explosive devices (IEDs).

Cordon and Search. Cordon and search, the only company-size mission, consists of an extensive planning period; an air assault; the establishment of a patrol base; and then the cordon and search, which can escalate into an urban attack. This mission provides cadets the opportunity to conduct deliberate troop-leading procedures and mission rehearsals. When the cadets are entering the village, they must establish contact with the village leader. The cadet company commander, through an interpreter, discusses the operation with the sheik; tries to gain his trust and cooperation; and executes a safe, controlled search of the village.

The enemy also infiltrates the village, and the cadets must then search and clear the buildings with the enemy in them. After the battle, the cadet commander must return to the sheik and repair the relationship damaged by the enemy attack. This was an eye-opening experience for all cadets, from having to talk through an interpreter and deal with the obvious—and not so obvious—cultural differences, to conducting building and room clearance in a company operation.

Quick-Reaction-Force Operations. Quick-reaction forces interact with other missions and conduct their own separate missions, including mortar team searches, downed aircrew rescues, and medical evacuation support. They conduct troop-leading procedures based on priorities given by the regimental commander. This mission allows cadets to conduct planning

The company commander meets with the village sheik.

along multiple timelines and to coordinate with multiple units to support the mission.

Continuous Operations

One difference that stood out during the summer training of 2006 from previous summers was that operations were continuous. The regimental commander and staff managed all aspects of the cadet's summer. They organized training, events, and activities for downtime (what little there was). The staff conducted planning for all missions and training events and coordinated with eight company commanders daily during battle update briefs. The result was a summer training program that was run by cadets for cadets from the first day to the last.

Objectives

The objective is not to make the cadets experts in all of the tasks, but to place them in situations outside of their comfort zone and force them to make difficult decisions. The overall purpose of CFT is to train, instruct, test, and validate cadets on specific Basic Officer Leader Course I (BOLC I) tasks, military program required tasks, and the Chief of Staff of the Army's warrior tasks and drills—focused by the Global War on Terrorism within the contemporary operating environment.

The CFT, especially the second detail, exposes cadets to what they can expect to see when they graduate. They are pushed a little harder, hold more responsibility as cadet leaders, and learn techniques and procedures they take directly to the Army as platoon leaders.

Captain Morgan is the cadet summer training S-3 at the United States Military Academy. Previous assignments include commander of Charlie Company and Headquarters and Headquarters Company, 2d Battalion, 502d Infantry Regiment, 101st Airborne Division (Air Assault) during Operation Iraqi Freedom and Infantry Requirements Analyst at the Futures Center, Headquarters, United States Army Training and Doctrine Command, Fort Monroe, Virginia.

Dedication

The following members of the Engineer Regiment have been lost in the Global War on Terrorism since March 2003. We dedicate this issue to them.

Name	**Unit**	**Location**
Adams, Private Algernon	Charlie Company, 122d Engineer Battalion	Graniteville, South Carolina
CarolinaAdams III, Specialist Clarence	91st Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Akins, Sergeant Kevin D.	Alpha Company, 391st Engineer Battalion	Asheville, North Carolina
Allen, First Lieutenant Louis E.	Headquarters & Headquarters Company, 42d Infantry Division	Troy, New York
Anderson, Corporal Andy D.	Bravo Company, 46th Engineer Battalion	Fort Rucker, Alabama
Andrews, Specialist Harley D.	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Arnold Sr., Sergeant Larry R.	Bravo Company, 150th Engineer Battalion	Quitman, Mississippi
August, Captain Matthew J.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Ayro, Private First Class Lionel	73d Engineer Company, 25th Infantry Division	Fort Lewis, Washington
Barbret, Private First Class Mark A.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Barnett, First Lieutenant Christopher W.	Headquarters & Headquarters Company, 156th Armor Regiment	Shreveport, Louisiana
Bevington, Sergeant Allan R.	40th Engineer Battalion, 1st Armored Division	Baumholder, Germany
Biskie, Sergeant Benjamin W.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Boatright, Sergeant Michael L.	20th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Boehmer, Sergeant Jeremiah J.	562d Engineer Company, 172d Stryker Brigade Combat Team	Fort Wainwright, Alaska
Bossert, Sergeant Andrew L.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Bowen, Private First Class Samuel R.	Headquarters Service Company, 216th Engineer Battalion	Hamilton, Ohio
Bradley, Staff Sergeant Kenneth R.	588th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Brinlee, Specialist Kyle A.	Bravo Company, 120th Engineer Battalion	Pryor, Oklahoma
Brooks, Staff Sergeant Cory W.	Alpha Company, 153d Engineer Battalion	Wagner, South Dakota
Brown, Specialist Philip D.	Bravo Company, 141st Engineer Battalion	Jamestown, North Dakota
Bunch, Specialist Joshua I.	91st Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Buzzard, Sergeant Jason J.	8th Infantry Regiment, 4th Infantry Division	Fort Hood, Texas
Byers, Specialist Casey	Bravo Company, 224th Engineer Battalion	Ottumwa, Iowa
Caradine Jr., Specialist Ervin	91st Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Carroll, Specialist James D.	Alpha Company, 230th Engineer Battalion	McKenzie, Tennessee
Carter, Specialist Justin B.	15th Infantry Regiment, 3d Infantry Division	Fort Benning, Georgia
Castro, Specialist Jonathan	73d Engineer Company, 25th Infantry Division	Fort Lewis, Washington
Caughman, Private First Class Thomas D.	Charlie Company, 391st Engineer Battalion	Spartanburg, South Carolina
Chan, Specialist Doron	Detachment 2, 411th Engineer Brigade	New Windsor, New York

Name	**Unit**	**Location**
Chance III, Specialist James A.	Charlie Company, 890th Engineer Battalion	Columbia, Mississippi
Cheatham, Private First Class Jonathan M.	Headquarters & Headquarters Company, 489th Engineer Battalion	North Little Rock, Arkansas
Christensen, Staff Sergeant Thomas W.	652d Engineer Company, 397th Engineer Battalion	Ellsworth, Wisconsin
Clark, Sergeant Carlton A.	2d Brigade Special Troops Battalion, 101st Airborne Division	Fort Campbell, Kentucky
Clark, Corporal Ryan J.	40th Engineer Battalion, 1st Armored Division	Baumholder, Germany
Cleary, First Lieutenant Michael J.	15th Infantry Regiment, 3d Infantry Division	Fort Benning, Georgia
Coles, Sergeant Dominic R.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Cooley, Sergeant First Class Sean M.	Bravo Company, 150th Engineer Battalion	Quitman, Mississippi
Corral, Sergeant Dennis A.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Cox Jr., First Lieutenant Simon T.	66th Armor Regiment, 4th Infantry Division	Fort Hood, Texas
Creamean, Specialist Tyler L.	73d Engineer Company, 25th Infantry Division	Fort Lewis, Washington
Cuaresma, Sergeant Sirlou C.	62d Engineer Battalion, 13th Sustainment Command	Fort Hood, Texas
Damon, Captain Patrick D.	Headquarters & Headquarters Company, 240th Engineer Group	Augusta, Maine
Davis, Private Brandon L.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Davis, Specialist Raphael S.	Bravo Company, 223d Engineer Battalion	Calhoun City, Mississippi
Davis, Sergeant Robert G.	864th Engineer Battalion, 555th Maneuver Enhancement Brigade	Fort Lewis, Washington
Diaz, First Lieutenant Carlos J.	69th Armor Regiment, 3d Infantry Division	Fort Benning, Georgia
Dill, Staff Sergeant Christopher W.	3d Detachment, 390th Infantry Regiment	Pennsauken, New Jersey
Dima, Sergeant Catalin D.	Headquarters Company, 411th Engineer Brigade	New Windsor, New York
Dostie, Specialist Thomas J.	Headquarters Service Company, 133d Engineer Battalion	Portland, Maine
Drexler, Private Jeremy L.	91st Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Eckert Jr., Sergeant Gary A.	Charlie Company, 983d Engineer Battalion	Monclova, Ohio
Esposito, Captain Phillip T.	Headquarters & Headquarters Company, 42d Infantry Division	Troy, New York
Evans II, Specialist Michael S.	Bravo Company, 1088th Engineer Battalion	New Roads, Louisiana
Falaniko, Private Jonathan I.	70th Engineer Battalion, 1st Armored Division	Fort Riley, Kansas
Farrow, Staff Sergeant Jefferey J.	146th Quartermaster Company, 301st Area Support Group	Fort Totten, New York
Faulkner, Sergeant James D.	20th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Fettig, Specialist Jon P.	957th Engineer Company, 68th Troop Command	Bismarck, North Dakota
Flores, Staff Sergeant Omar D.	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Floyd, Sergeant Alkaila T.	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Forbes, Specialist Aaron M.	67th Armor Regiment, 4th Infantry Division	Fort Hood, Texas
Franklin, Private First Class Michael W.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Gabrielson, Sergeant First Class Dan H.	652d Engineer Company, 397th Engineer Battalion	Ellsworth, Wisconsin
Garceau, Specialist Seth K.	Alpha Company, 224th Engineer Battalion	Burlington, Iowa
Garcia, Corporal J. Adan	1st Brigade Special Troops Battalion, 10th Mountain Division	Fort Drum, New York
Gaunky, Private First Class Anthony A.	3d Brigade Special Troops Battalion, 101st Airborne Division	Fort Campbell, Kentucky

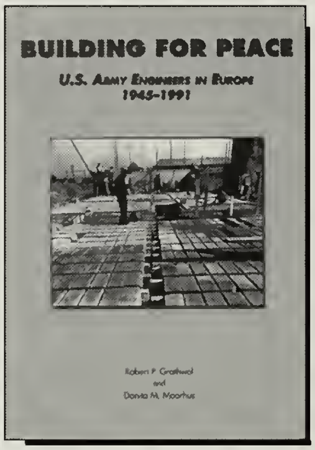
Name	Unit	Location
Gaylord, Private First Class Alva L.	Charlie Company, 110th Engineer Battalion	Lexington, Missouri
Gelineau, Specialist Christopher D.	Detachment 1, 133d Engineer Battalion	Gardiner, Maine
Gibbs, Private First Class Mathew V.	Headquarters & Headquarters Company, 648th Engineer Battalion	Statesboro, Georgia
Gienau, Second Lieutenant Richard B.	Alpha Company, 224th Engineer Battalion	Burlington, Iowa
Gilman, Sergeant Benjamin L.	41st Engineer Battalion, 10th Mountain Division	Fort Drum, New York
Goldberg, Specialist David J.	Detachment 1, Charlie Company, 52d Engineer Battalion	Fort Carson, Colorado
Granados, Corporal Cesar A.	8th Infantry Regiment, 4th Infantry Division	Fort Hood, Texas
Haight, Specialist Charles G.	14th Engineer Battalion, 555th Combat Engineer Group	Fort Lewis, Washington
Hall Jr., Specialist Robert E.	Charlie Company, 467th Engineer Battalion	Greenwood, Mississippi
Hattamer, Staff Sergeant Stephen C.	652d Engineer Company, 397th Engineer Battalion	Ellsworth, Wisconsin
Hawkins, Sergeant Gene A.	14th Engineer Battalion, 555th Combat Support Brigade (ME)	Fort Lewis, Washington
Hawkins II, Staff Sergeant Omer T.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Hendrickson, Staff Sergeant Kenneth W.	957th Engineer Company, 68th Troop Command	Bismarck, North Dakota
Hermanson, Specialist Michael L.	Alpha Company, 164th Engineer Battalion	Minot, North Dakota
Hill, Specialist Joshua L.	Alpha Company, 391st Engineer Battalion	Asheville, North Carolina
Hodge, Sergeant Jeremy M.	Bravo Company, 612th Engineer Battalion	Tiffin, Ohio
Hoffman, Sergeant First Class James T.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Hollinsaid, Staff Sergeant Lincoln D.	11th Engineer Battalion, 3d Infantry Division	Fort Stewart, Georgia
Holmes, Specialist James J.	Detachment 2, Charlie Company, 141st Engineer Battalion	Hettinger, North Dakota
Hoyer, Private First Class Bert E.	652d Engineer Company, 397th Engineer Battalion	Ellsworth, Wisconsin
Hubbell, Specialist Cory A.	46th Engineer Battalion, 1st Combat Support Brigade	Fort Polk, Louisiana
Hufstedler, First Lieutenant Doyle M.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Hurley, First Lieutenant Joshua C.	326th Engineer Battalion, 101st Airborne Division	Fort Campbell, Kentucky
Huxley Jr., Private First Class Gregory P.	317th Engineer Battalion, 3d Infantry Division	Fort Benning, Georgia
Jackson, Specialist Marlon P.	94th Engineer Battalion, 130th Engineer Brigade	Vilseck, Germany
Jackson II, Staff Sergeant William S.	16th Engineer Battalion, 1st Armored Division	Giessen, Germany
Jodon, Sergeant Andrew R.	3d Battalion, 3d Infantry Division	Fort Stewart, Georgia
Johnson, Private First Class Rayshawn S.	299th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Jones, Sergeant First Class Michael D.	Alpha Company, 133d Engineer Battalion	Belfast, Maine
Jones, Specialist Robert L.	40th Engineer Battalion, 1st Armored Division	Baumholder, Germany
Jordan Jr., Sergeant Curt E.	14th Engineer Battalion, 555th Combat Engineer Group	Fort Lewis, Washington
Kading, Sergeant First Class Matthew R.	Charlie Company, 983d Engineer Battalion	Monclova, Ohio
Kane, Staff Sergeant Joseph M.	67th Armor Regiment, 4th Infantry Division	Fort Hood, Texas
Karr Jr., Specialist Michael G.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Kendall, Specialist Dustin L.	68th Armor Regiment, 4th Infantry Division	Fort Carson, Colorado

Name	**Unit**	**Location**
Kimbrough, Lieutenant Colonel Paul Wayne	Team 28, 416th Engineer Command	Fort Benning, Georgia
Kiser, Sergeant Timothy C.	Forward Logistical Element Company, 340th Forward Support Battalion	Red Bluff, California
Koch, Specialist Matthew A.	70th Engineer Battalion, 1st Armored Division	Fort Riley, Kansas
Koenig, Staff Sergeant Lance J.	Bravo Company, 141st Engineer Battalion	Jamestown, North Dakota
Laird, Sergeant Dustin D.	913th Engineer Company, 46th Engineer Battalion	Union City, Tennessee
Landrus, Staff Sergeant Sean G.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Lawton, Staff Sergeant Mark A.	Alpha Company, 244th Engineer Battalion	Boulder, Colorado
Linden, Specialist Troy C.	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Longstreth, Private First Class Duane E.	307th Engineer Battalion, 82d Airborne Division	Fort Bragg, North Carolina
Love, Private First Class Joseph I.	84th Engineer Battalion, 8th Sustainment Command (Theater)	Schofield Barracks, Hawaii
Luckey, Sergeant Bryan C.	562d Engineer Company, 172d Stryker Brigade Combat Team	Fort Wainwright, Alaska
Lufkin, Private First Class Caleb A.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Lutters, Specialist Derrick J.	Alpha Company, 891st Engineer Battalion	Pittsburg, Kansas
Mahlenbrock, Specialist David P.	65th Engineer Battalion, 25th Infantry Division	Schofield Barracks, Hawaii
Manzano, Private First Class Pablo	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Martin, Private First Class Ryan A.	Headquarters Service Company, 216th Engineer Battalion	Hamilton, Ohio
Martinez, Staff Sergeant Misael	16th Engineer Battalion, 1st Armored Division	Giessen, Germany
Martinez-Salazar, Specialist Roberto L.	14th Engineer Battalion, 555th Maneuver Enhancement Brigade	Fort Lewis, Washington
Mason, Specialist Nicholas C.	Charlie Company, 276th Engineer Battalion	West Point, Virginia
McCaffrey, Sr., Specialist Patrick R.	Alpha Company, 579th Engineer Battalion	Petaluma, California
McClain, Sergeant Charles J.	3d Brigade Special Troops Battalion, 10th Mountain Division	Fort Drum, New York
McMullen, Staff Sergeant Michael J.	243d Engineer Company, 121st Engineer Battalion	Reisterstown, Maryland
McNail, Specialist Robert A.	Bravo Company, 150th Engineer Company	Quitman, Mississippi
Menyweather, Staff Sergeant Eddie E.	588th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Meyer, Private First Class Jason M.	11th Engineer Battalion, 3d Infantry Division	Fort Stewart, Georgia
Micks, Specialist Joseph P.	54th Engineer Battalion, 130th Engineer Brigade	Bamberg, Germany
Miller, Sergeant John W.	Alpha Company, 224th Engineer Battalion	Burlington, Iowa
Millsap, First Sergeant Timothy J.	70th Engineer Battalion, 1st Armored Division	Fort Riley, Kansas
Mitchell, Sergeant Keman L.	4th Engineer Battalion, 4th Infantry Division	Fort Carson, Colorado
Mitchell, Specialist Sean R.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Moothart, Sergeant Travis A.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Moreno, Specialist Jaime	20th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Morgan, Specialist Dennis B.	Detachment 1, 153d Engineer Battalion	Winner, South Dakota
Morningstar, Staff Sergeant Christopher R.	562d Engineer Company, 172d Stryker Brigade Combat Team	Fort Wainwright, Alaska
Muldoon, Sergeant James P.	68th Armor Regiment, 4th Infantry Division	Fort Carson, Colorado

Name	Unit	Location
Murray, Sergeant David J.	Bravo Company, 1088th Engineer Battalion	New Roads, Louisiana
Nakis, Specialist Nathan W.	Bravo Company, 52d Engineer Battalion	Albany, Oregon
Naputi, Specialist Richard Junior D.	15th Infantry Regiment, 3d Infantry Division	Fort Benning, Georgia
Neusche, Specialist Joshua M.	203d Engineer Battalion, 35th Engineer Brigade	Joplin, Missouri
Nieves, Specialist Isaac M.	82d Engineer Battalion, 1st Infantry Division	Bamberg, Germany
Norquist, Specialist Joseph C.	588th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Nurre, Sergeant Joseph C.	Bravo Company, 463d Engineer Battalion	Weirton, West Virginia
Ojeda, Specialist Ramon C.	84th Engineer Battalion, 25th Infantry Division	Schofield Barracks, Hawaii
Ottolini, Staff Sergeant Michael C.	Alpha Company, 579th Engineer Battalion	Petaluma, California
Palacios, Specialist Gabriel T.	588th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Paliwoda, Captain Eric T.	4th Engineer Battalion, 4th Infantry Division	Fort Carson, Colorado
Pankey, Jr., Sergeant Larry W.	Charlie Company, 467th Engineer Battalion	Greenwood, Mississippi
Parker, Private First Class James D.	588th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Parker, Private First Class Kristian E.	Charlie Company, 205th Engineer Battalion	Slidell, Louisiana
Parrish, Staff Sergeant Lawrence L.	Headquarters & Headquarters Company, 110th Engineer Battalion	Kansas City, Missouri
Penamedina, Staff Sergeant Abraham D.	20th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Pernell, Sergeant Carlos E.	Bravo Company, 46th Engineer Battalion	Fort Rucker, Alabama
Pinkston, Sergeant Foster	Headquarters Service Company, 878th Engineer Battalion	Augusta, Georgia
Pintor, Captain Dennis L.	20th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Poulin Sr., Sergeant Lynn R.	Alpha Company, 133d Engineer Battalion	Belfast, Maine
Preusse, Corporal Randall D.	Alpha Company, 386th Engineer Battalion	Austin, Texas
Quinton, Specialist Bryan L.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Rafferty, First Sergeant Christopher C.	37th Engineer Battalion, 20th Engineer Brigade	Fort Bragg, North Carolina
Ramirez, Sergeant Angel De Jesus L.	16th Engineer Battalion, 1st Armored Division	Giessen, Germany
Ramirez, Sergeant Reyes	40th Engineer Battalion, 1st Armored Division	Baumholder, Germany
Ramsey, Specialist Christopher J.	Bravo Company, 1088th Engineer Battalion	New Roads, Louisiana
Raney, Private First Class Cleston C.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Ray, Staff Sergeant Joseph R.	Alpha Company, 391st Engineer Battalion	Asheville, North Carolina
Reed, Staff Sergeant Johnathan R.	Bravo Company, 1088th Engineer Battalion	New Roads, Louisiana
Reinke, Staff Sergeant Gavin B.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Reyes, Sergeant Luis R.	947th Engineer Company, 89th Troop Command	Pueblo, Colorado
Reyna, Specialist Seferino J.	70th Engineer Battalion, 1st Armored Division	Fort Riley, Kansas
Rodriguez, Staff Sergeant Joseph E.	8th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Rooney, Sergeant First Class Robert E.	379th Engineer Company, 51st Troop Command	Bourne, New Hampshire
Ruhren, Specialist David A.	Charlie Company, 276th Engineer Battalion	West Point, Virginia

Name	**Unit**	**Location**
Rusin, Private First Class Aaron J.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Ruth, Sergeant Monta S.	15th Infantry Regiment, 3d Infantry Division	Fort Benning, Georgia
Rymer II, Specialist Lyle W.	Detachment 1, 239th Engineer Battalion	Fort Chaffee, Arkansas
Sanehez, Sergeant Ian T.	32d Infantry Regiment, 10th Mountain Division	Fort Drum, New York
Seale, Staff Sergeant Stephen A.	2d Brigade Special Troops Battalion, 101st Airborne Division	Fort Campbell, Kentucky
Seesan, First Lieutenant Aaron N.	73d Engineer Company, 25th Infantry Divisin	Fort Lewis, Washington
Segura Jr., Sergeant Leroy	362d Engineer Company, 54th Engineer Battalion	Fort Benning, Georgia
Smette, Sergeant Keith L.	957th Engineer Company, 68th Troop Command	Bismarck, North Dakota
Smith, Sergeant First Class Paul R.	11th Engineer Battalion, 3d Infantry Division	Fort Stewart, Georgia
Soelzer, Captain Christopher F.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Splinter, Major Christopher J.	5th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Strange, Private First Class William R.	91st Engineer Battalion, 1st Cavalry Division	Fort Hood Texas
Taylor III, Sergeant Norman R.	68th Armor Regiment, 4th Infantry Division	Fort Carson, Colorado
Tobler, Specialist Brandon S.	Detachment 1, 671st Engineer Company	Portland, Oregon
Trevithick, Specialist Richard K.	9th Engineer Battalion, 1st Cavalry Division	Schweinfurt, Germany
Tyrrell, Private Seott M.	299th Engineer Battalion, 4th Infantry Division	Fort Hood, Texas
Tyson, Second Lieutenant Andre D.	Alpha Company, 579th Engineer Battalion	Petaluma, California
Unruh, Specialist Robert Oliver	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Vargas-Medina, Staff Sergeant Oscar D.	84th Engineer Battalion, 25 Infantry Division	Schofield Barracks, Hawaii
Villanueva, Sergeant First Class Joselito O.	9th Engineer Battalion, 1st Cavalry Division	Schweinfurt, Germany
Walker, First Lieutenant Laura M.	864th Engineer Battalion, 555th Maneuver Enhancement Brigade	Fort Lewis, Washington
Ward, Private First Class Andrew M.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Warren, Sergeant First Class Charles H.	Charlie Company, 648th Engineer Battalion	Statesboro, Georgia
Washington, Sergeant Bennie J.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Webb, Sergeant Charles J.	82d Engineer Battalion, 1st Infantry Division	Bamberg, Germany
Wegar, Specialist Michael S.	20th Engineer Battalion, 1st Cavalry Division	Fort Hood, Texas
Wentz, Specialist Cody L.	Alpha Company, 141st Engineer Battalion	Edgeley, North Dakota
White III, Private First Class Robert C.	864th Engineer Battalion, 555th Maneuver Enhancement Brigade	Fort Lewis, Washington
Widner, Specialist Vernon R.	3d Brigade Special Troops Battalion, 101st Airborne Division	Fort Campbell, Kentucky
Wilkins III, First Lieutenant Charles L.	Headquarters Service Company, 216th Engineer Battalion	Hamilton, Ohio
Williams IV, Sergeant Arthur C.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Wolf, Specialist James R.	Headquarters & Headquarters Company, 52d Engineer Battalion	Fort Carson, Colorado
Wood, Sergeant Brian M.	9th Engineer Battalion, 1st Cavalry Division	Schweinfurt, Germany
Wright, Specialist Brian A.	135th Engineer Company, 876th Engineer Battalion	Lawrenceville, Illinois
Zamora, Corporal Jose	2d Brigade Special Troops Battalion, 101st Airborne Division	Fort Campbell, Kentucky

Book Reviews



Building for Peace: U.S. Army Engineers in Europe, 1945-1991, by Robert P. Grathwol, Ph.D., and Donita M. Moorhus, U.S. Army Center for Military History, CMH Pub 45-1-1, Government Printing Office: Washington, D.C., 2005, 393 pages, GPO S/N: 008-029-00410-1, $62.00 (paper).

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It is difficult to make a technical history both readable and accurate. *Building for Peace*, by Robert Grathwol and Donita Moorhus, manages to accomplish both. This well-researched first volume of the Center for Military History's U.S. Army in the Cold War series tells the story of U.S. Army engineers in Europe from 1945 - 1991 in exquisite detail, making it recommended professional reading for all in the Army engineering community.

Organized into three parts, the narrative flows logically from efforts in postwar reconstruction (1945 - 1949) to the mutual defense of western Europe (1950 - 1973), and finally to the era of the Europe Division, U.S. Army Corps of Engineers®, and the end of the Cold War (1974 - 1991). The authors take great care to not only describe the mission and organization of the various Army engineer activities in Europe but also to establish the context that shaped the decisions taken by engineer leaders. This book is full of photographs, tables, and maps that help the reader visualize the events that transpired and the challenges facing U.S. Army engineers as they support the Army and Air Force in Europe.

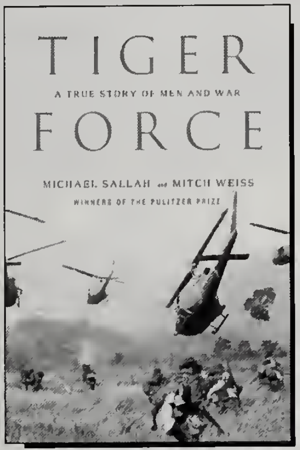
Part one of the narrative describes the fluid situation facing Army engineers in the early days of the occupation of Germany, and does a great job of describing the engineering organization, priorities, and challenges overcome. The authors capture the difficulties of supporting the drawdown and redeployment of the Army, while simultaneously developing ports and lines of communication for constabulary forces and helping reestablish critical civil infrastructure. They also capture the uncertainty of the circumstances in the immediate postwar era, culminating in the blockade of Berlin by the Soviet Union and the Berlin Airlift.

The second part of the narrative covers a much more extensive period of time and follows the evolution of engineering support in Europe through the challenges of crash construction programs for the buildup of Army forces in the early 1950s, of doing business with the newly sovereign West German Republic, and several evolutions of engineering organization built in response to the requirements of the day. The rationale for the establishment and employment of the Joint Construction Agency; the U.S. Army Construction Agency, Germany; and the Engineer Command are discussed in detail, as are the challenges they faced.

The largest part of this history is devoted to recounting the establishment, service, and ultimate inactivation of one organization: the Europe Division of the U.S. Army Corps of Engineers from 1974 - 1991. It is clearly well researched; however, this part of the narrative seems to drag in the telling. The authors seem to put far more emphasis on discussing the details of programs and projects in this section. As a result, the narrative jumps around a bit rather than flowing chronologically, making it hard to follow at times. Even so, the authors convey the complexity and difficulty of the mission as well as the flexibility of Army engineers in meeting it.

This history is highly recommended to all in the Army engineering community. The flexibility, innovation, and professionalism recounted are worthy of study and reflection. No doubt today's Army engineers can draw lessons from their predecessors in Europe as they face today's engineering challenges in support of our Army and the nation.

Reviewed by Lieutenant Colonel Stephen V. Tennant, U.S. Army (Retired), Assistant Professor, Command and General Staff College, Fort Leavenworth, Kansas.


TIGER
A TRUE STORY OF MEN AND WAR
FORCE
MICHAEL SALLAH and MITCH WEISS
WINNERS OF THE PULITZER PRIZE

Tiger Force: A True Story of Men and War, by Michael Sallah and Mitch Weiss, Little, Brown & Company: New York, May 2006, 416 pages, ISBN: 0316159972 (nonfiction) ISBN-13: 9780316159975 (general), $25.95 (hardcover)

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During the Vietnam War, "Tiger Force" was the code name of an elite platoon of the 1st Battalion, 327th Infantry Regiment, 101st Airborne Division. Tiger Force was intended to "outguerrilla the guerrillas," scrapping the techniques of conventional warfare to take the fight to the enemy in the jungle. Along the way, it also scrapped the rules of war.

The battalion executive officer organized the 45-man volunteer force in 1966, and it became one of the war's most highly decorated units, paying for its reputation with heavy casualties. In 1967, the Tiger Force platoon went on a seven-month rampage through South Vietnam's central highlands that left more than 325 civilians dead—mostly children, women, and old men.

Unlike other elite units such as the Special Forces, Tiger Force was made up of a mixed lot, elite only in the fighting sense. Many had served jail time, and many Tiger Force veterans died young from cancer, cirrhosis of the liver, or suicide. Commanders set the tone, and Tiger Force leaders were close to psychopathic in their hatred for Vietnamese people, no matter what side they were supposed to be on. *It is a free-fire zone; if it moves, it is VC. Kill it!* And that they did. Most of the murdered Vietnamese appeared to be guilty only of being peasant farmers who didn't want to leave their land.

The real atrocities began with the routine and relentless use of free-fire zones: 105- and 155-millimeter howitzer random harassment and interdiction fire; helicopter gunships; Puff, the Magic Dragon; fighter and attack jets and their napalm; the B-52 carpet bombing, etc., etc., …

From 1971 to 1975, the Army mounted an investigation that documented the crimes. Our civilian leadership decided that "nothing beneficial" could result from prosecuting the platoon members or their leaders.

The atrocities in this book are as bad as My Lai. Basically, My Lai was a one-day incident where an Americal Division line outfit went berserk and killed somewhere around 500 people; these Tiger Force atrocities occurred over a period of months. Their commanders clearly knew what they were doing and encouraged it. How far up the ladder it went, I don't know, but I wish I did.

Reviewed by Mr. Jeffrey L. Rosemann, an instructional systems specialist with the Officers Education Branch, Department of Training Development, United States Army Engineer School. A retired infantry Soldier, he also served as the 2d Infantry Division historian during the beginning of the 50th Anniversary of the Korean War.

Military Review Seeks Essays for 2007 Writing Competition

For the 2007 General William E. DePuy Special Topics Writing Competition, *Military Review* seeks original essays on "Consolidating Victory: Stability and Reconstruction Operations." Winning papers will be carefully researched, analytically oriented critiques, proposals, or relevant case histories that show evidence of imaginative, even unconventional, thinking. Submissions generally should not exceed 5,000 words.

Winners will be announced in May 2007. First prize is featured publication in a future edition of *Military Review*, a $1,000 honorarium, and a certificate. Second prize offers publication in *Military Review*, a $750 honorarium, and a certificate. Third prize offers publication in *Military Review*, a $500 honorarium, and a certificate. Fourth prize offers publication in *Military Review*, a $250 honorarium, and a certificate. Honorable mention offers publication in *Military Review*, a $100 honorarium, and a certificate.

Essays should be submitted with an enrollment form via e-mail or in hard copy with a CD not later than 1 April 2007. Send e-mail submissions to <*milrevweb@leavenworth.army.mil*> (Subject: Competition). Mail hard copies with a CD to *Military Review*, ATTN: Competition, 294 Grant Avenue, Fort Leavenworth, Kansas 66027-1254. For more details—to include a copy of the enrollment form, criteria for judging, and a list of potential topics—visit *Military Review* online at <*http://usacac.army.mil/CAC/milreview/index.asp*>.

Photo by Jenifer Thalhauser, Planning Division, United States Army Corps of Engineers, New York District

Innovative Methods Save Vermont Recreation Area

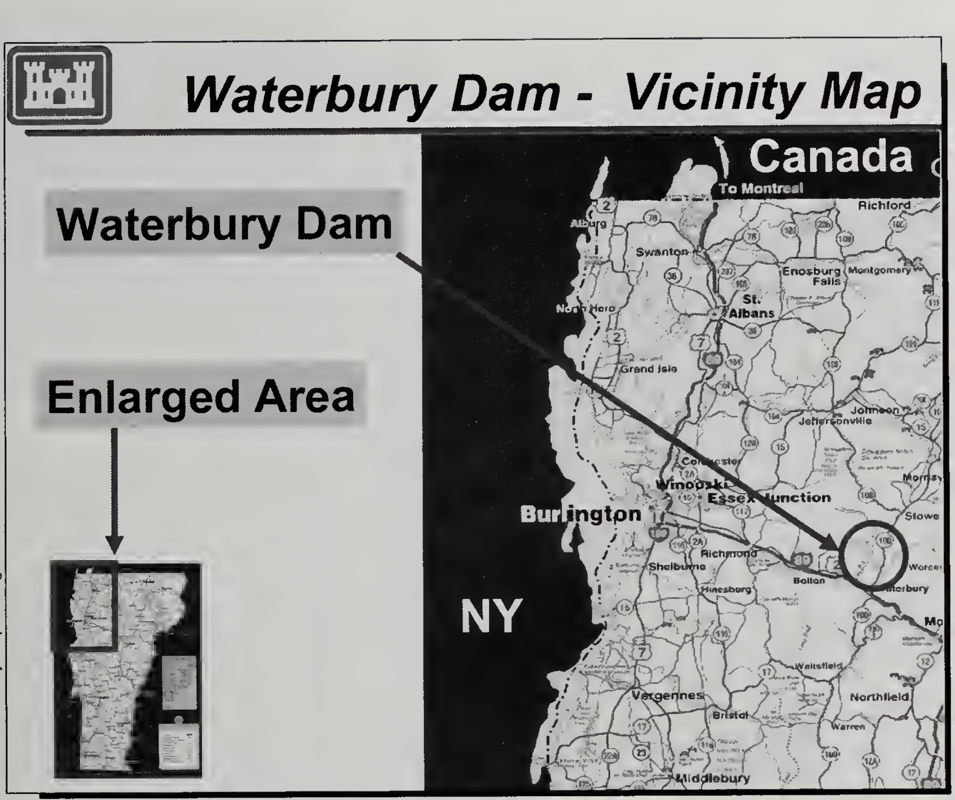
By Dr. JoAnne Castagna

Each year, primarily during the summer months, hundreds of visitors, nature enthusiasts, recreation seekers, and local residents travel to Vermont's 850-acre Waterbury Reservoir campground to enjoy the outdoor activities available along the 19 miles of pristine shoreline. The area is perfect for camping, fishing, hiking, and water sports.

In 1935, the United States Army Corps of Engineers® designed and managed the construction of the dam in response to a flooding disaster and since then has periodically modified it. In recent years, the dam has experienced seepage problems, and the sloped banks along the shoreline became unstable due to erosion.

In 2000, the State of Vermont lowered the reservoir due to safety concerns at the nearby Waterbury Dam and lowered it again in 2002 when the Corps began construction work on the dam. The reservoir was lowered to 520 feet, but the water is currently at 550 feet and will return to summer pool level (590 feet) when the work is completed. Also, the reservoir's water level was lowered each winter when the campground closed.

Lowering the reservoir takes pressure off the dam, reduces seepage, and allows safer conditions for construction work. However, this drawdown and the wave action from recreational boats against the exposed shoreline were contributing factors



United States Army Corps of Engineers, New York District

Site map for the Waterbury Dam

to the shore's erosion and resulted in its instability. In response to this safety hazard, the Corps's New York District, with the assistance of other Corps districts, used traditional and innovative engineering techniques to make the banks of the reservoir safer.

The sloped banks of the reservoir were vegetated, but when the reservoir was lowered, the lower portions without vegetation were exposed. This caused the soil on the upper part of the bank to erode and uproot vegetation, especially during rainfall. When the vegetation was lost, the upper portions of the bank were also exposed and subject to erosion.

With the ground exposed, groundwater percolated out of the soil—contributing to the slope's erosion—and added additional soil to the reservoir. Allowing this runoff to continue would cause the campground to lose large portions of land and would adversely affect the water quality of the reservoir and downstream river. In addition, the flow of sediment into the reservoir creates turbid, muddy water; reduces the water's oxygen level; and increases the water's temperature, which can harm water habitats.

The Corps, in collaboration with the State of Vermont, constructed a shoreline stabilization project for 1,100 feet of reservoir shoreline this summer, using both traditional and bioengineering methods.

Traditional techniques, using stone or riprap, stabilized the bottom of the slope. The weight of the stone prevents wave action from moving or removing the stone and prevents scoring or erosion. This part of the slope must remain stable for the upper areas (stabilized using bioengineering techniques) to remain in place and function properly.

Bioengineering techniques use dormant plant cuttings from woody plants that root easily to alleviate soil erosion. Planted in specific arrangements depending on the

Photo by Construction Division, United States Army Corps of Engineers, New York District

The slope was regraded prior to placing riprap for stabilization.

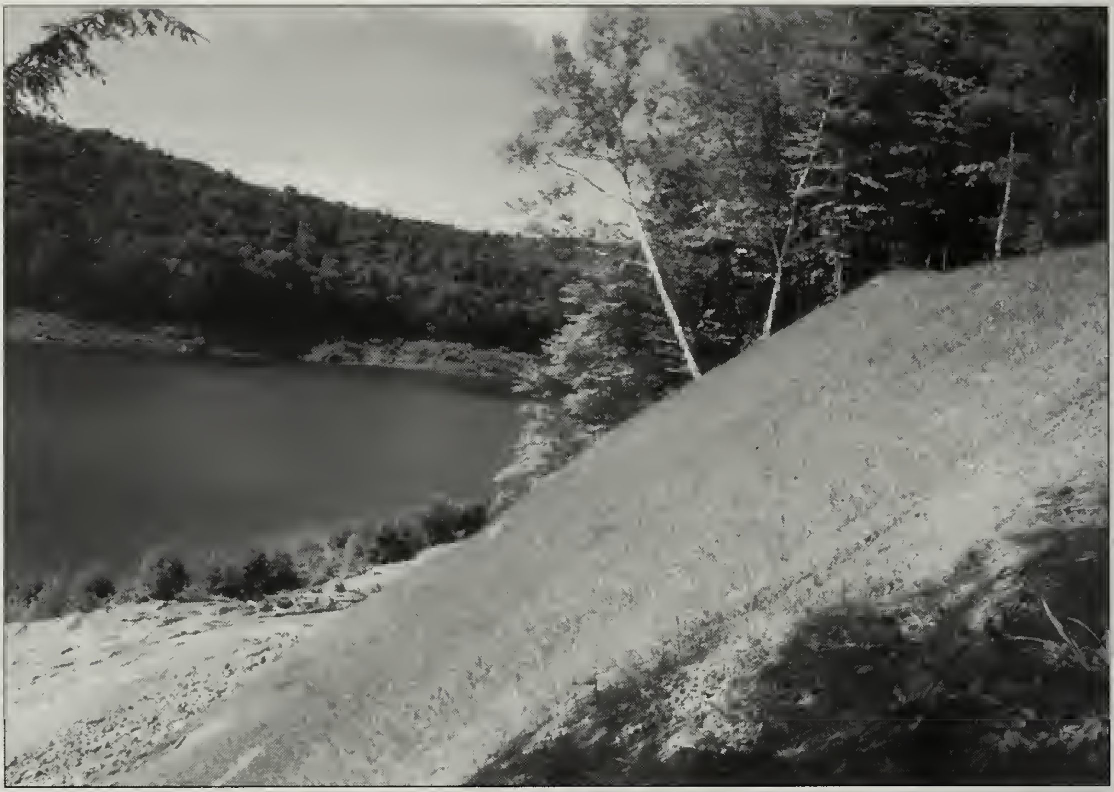


Photo by Marty Goff, United States Corps of Engineers, New York District

Riprap was placed at the bottom of the slope for stabilization, and the regraded slope was covered with grass seeding prior to fall plantings.

technique, the root systems hold the soil together and prevent sediment loss. Only native plants were used for this project. Willow, dogwood, and alder species were planted at the bottom of the slope to provide quick rooting. A mix of low-growing to medium-size shrubs were planted on the rest of the slope.

The State of Vermont is a strong proponent of the bioengineering technique and encouraged its use. The Corps has used bioengineering in the past, but this was the first time native plants were used. A departure from the more traditional approach—which typically involves steel sheet pile and backfilling—resulted in a more natural and sustainable slope.

Combining traditional and bioengineering techniques is beneficial because a stable slope was achieved without diminishing the area's natural appearance, and it won't have the "engineered" look of many slope stabilization projects. The environment also benefits from combining the two techniques. Planting vegetation along the shoreline provides nesting and foraging habitats for native bird species and maintains the look and feel of the region for campground visitors.

With the stabilization at the bottom of the slopes completed, grass seed was sown at the top of the slopes for immediate slope stabililization. In the fall, a mix of live cuttings and containers of woody vegetation, such as shrubs and trees, were planted on the slopes for long-term stabilization. Planting in the fall is more conducive to plant survival than planting during the summer.

The project manager provided the following suggestions for other engineers performing similar shore stabilization projects:

- Coordinate constantly with various state agencies to make sure everyone agrees with the schedule and project goals to avoid unnecessary delays.
- Consider the "green" approach when trying to stabilize slopes. A bioengineered slope should be as stable as a typically constructed "hard" design.
- Be open to new and innovative ideas, even if they deviate from the traditional.

Although the Waterbury Reservoir campground is closed for the winter, when it reopens in the spring, the restored portions of the shoreline will be open to the public.

Dr. Castagna is a technical writer/editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

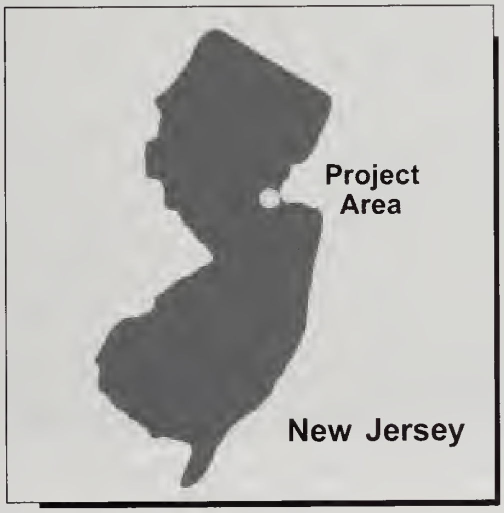
Restoring and Enhancing Historic Property

By Dr. JoAnne Castagna

The United States Army Corps of Engineers® Finderne Farms Wetlands Mitigation Project is part of the Green Brook Flood Control Project, designed to reduce flood damage in New Jersey's Raritan River Basin in north-central New Jersey (Middlesex, Somerset, and Union Counties). The mitigation project, located on 130 acres of land along the Raritan River in Bridgewater Township, enhances and restores the land around the historic Van Veghten House in Somerset County, by creating wildlife habitats and a public park. The state is proud of its history, and this was taken into account when the Corps's New York District collaborated with them in 2000 on this project.

According to the biologist and project coordinator, the wetland mitigation work is enhancing existing wetlands, forested land, and grassland habitats on the site and creating more than 20 acres of man-made wetlands to sustain wildlife and create an educational public park. The land was used for farming crops and livestock from the late 1600s to just a few years ago when Somerset County purchased it for open space preservation and park development. Years of farming had caused erosion problems on the land.

The Van Veghten family owned a huge tract of land that included all of the property now under construction at the mitigation site. The 18th Century red brick Dutch farmhouse, the historic Van Veghten House, still stands on the bluff above the floodplain with a view of the Raritan River. The house, presently occupied by the Somerset County Historical Society, has a rich history that includes sheltering General George Washington's Quartermaster General, General Nathaniel Greene, during the Revolutionary War, while his Soldiers camped nearby. A volunteer from the Somerset County Historical Society explained that General George Washington danced the night away there also.



A multisection precast concrete bridge is lowered by crane across a stream.

The Corps, in cooperation with the County Parks Commission, began construction in January 2006. The land was graded around the clock for approximately 2 months to prepare it for spring seeding. Grading sets the stage by achieving a soil elevation that supports the water needs required for wetland plant growth. The soil in the wetland creation areas was then tilled using a 30-inch plow-bedding harrow, to create mounds and depressions, mimicking the uneven surface of a natural wetland. The soil was then fertilized and limed, and this past spring nearly 100,000 trees and shrubs were planted. Habitat mitigation areas were also seeded with a mixture of native grasses and wild flowers.

Several wetland habitats, forested land, and grassland habitats were enhanced or created to provide nesting and foraging habitats for a variety of birds, amphibians, reptiles, aquatic invertebrates, butterflies, and mammals.

The public will be able to view these habitats by walking along a 2-mile nature trail created by the Corps. The trail meanders throughout the site and has signs to educate the public about the habitats and wildlife and provide facts about the nearby Van Veghten House. Also on the site are two playing fields with parking lots and access roads, making the site a part of the Raritan River Greenway. Although most of the work was completed in the summer of 2006, the 12 acres of recreational area, such as the trail and playing fields, won't be open to the public until the spring of 2007 so the grass and plants have a chance to grow.

The project coordinator provided the following suggestions for others planning a mitigation project:

- Contact plant nurseries early. Find out what species are available and if the quantity and plant size needed for the project are available.
- Plan ahead when using native plants. If the project calls for growing native species using seeds and cuttings collected

The banks of the "Finderne Brook"—that flows into the Raritan River—have been contoured to prepare for planting.

directly from the area, it's recommended that propagation activities be initiated at least two years in advance of project construction.

- Consider practical storage of plant material on-site. Plan storage for large quantities of plant material, especially bare-root trees and shrubs, on-site. Having a refrigerator truck, which mimics a greenhouse by maintaining temperature and humidity levels similar to a nursery, on-site allows storage of large quantities of plants and extends the time cuttings can be stored. Without the truck, storing and planting bare-root material is limited to 1 to 2 days for each delivery of plants. The truck also preserves live-stake material in its dormant state for a period extending beyond nursery availability.
- Have project designers make multiple site visits. Because conditions change, project designers should be involved team members during construction and visit the site several times during the design process. Incorporating any necessary design changes prior to construction helps to minimize delays and costly modifications.
- Collaborate with property stakeholders. The Corps reached an agreement with the New Jersey Historic Preservation Office to plant grassland rather than trees near the Van Veghten House to maintain the historic view of the Raritan River. The Corps also reached an agreement with a local utility company to plant unobstructive vegetation near overhead power lines to provide continued access to those areas.

The success of this mitigation project has encouraged the project coordinator to seek out other sites in the area to perform similar work. Wildlife already has been observed on the site, including red tail hawks, great blue herons, painted turtles, northern water snakes, freshwater clams, deer, and a resident red fox.

For more information about the Van Veghten House, contact the Somerset County Historical Society at (908) 218-1281.

Dr. Castagna is a technical writer/editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

Thousands of "willow stakes" are planted in burlap weed barriers along the side of the stream.

What the Project Entails

Wetland, Forested Land, and Grassland Habitat Enhancement and Creation

Forested Wetland. This is wetland that has deciduous woody vegetation with a tree canopy in excess of 20 feet in height. Approximately 14 acres of existing forested wetland were enhanced by planting trees (oak, ash, and sycamore) and shrubs (summersweet, silky dogwood, and high bush blueberry). Approximately 21 acres of pastureland were turned into forested wetland. The land was graded, then the area was seeded with a mix of wetland plants and floodplain grasses and planted with bare-root and container-plant material. Trees (oaks, ash, and sycamore) and shrubs (summersweet, silky dogwood, and high bush blueberry) were planted. In some areas the land was graded to create vernal pools, ephemeral spring ponding areas used by salamanders, invertebrates, and frogs for breeding.

Scrub-Shrub Wetland. This is a wetland that has primarily woody vegetation that is less than 20 feet tall. Approximately 8 acres were enhanced by seeding and planting the wetland to make it more desirable for various species of wildlife.

Emergent Wetland (Wet Marsh). Approximately 5 acres were enhanced by seeding and planting the wetland to make it more desirable for various species of wildlife.

Riparian Forest (Corridor Forest). This is a forest that borders a river, in this case the Raritan River. Approximately 25 acres of Riparian Forest were restored by seeding and planting. In addition, the Riparian Buffer (the strip of woody vegetation along the river's banks) was increased to 100 to 300 feet to create a habitat for wildlife that thrives in this type of environment, including species of birds, mammals, reptiles, and amphibians. In addition, the increased buffer sustains shade cover for fish habitats within the river. In this buffer area, various shrubs (elderberry, spicebush, and black haw viburnum) and trees (hickory and silver maple) were planted. The trees were selected because of their shaggy bark at maturity that could provide a suitable roosting habitat for bats during the summertime.

Stream Restoration. An unnamed 800-foot stream, referred to as the "Finderne Brook," runs through portions of the site. The stream was eroding and the Corps created a more natural water flow and restored its habitat. To improve the water flow, the area bordering the stream (the floodplain) was widened to prevent the stream's banks from eroding and an undersized pipe culvert, that was constricting flow, was replaced with a natural bottom arched culvert bridge. To improve the stream habitat and stabilize the banks, the stream was graded, seeded with floodplain grass, planted with wetland plant cuttings, and covered with a degradable coir matting (made of coconut fiber) to stabilize riverbank soils until the vegetation takes hold. To prevent soil erosion, supplemental riverbed stone was placed in the stream. Also, the stones create a series of pools and riffles for fish and invertebrate habitats such as crayfish and pickerel frogs that have already been sighted in the stream.

Grassland by the Van Veghten House. Thirty-nine acres of enhanced grassland have transformed the property around the Van Veghten House that overlooks the Raritan River. The grassland provides visitors an unobstructed view of the vista across the floodplain toward the Raritan River. The floodplain was seeded with warm season grasses (Indian grass and bluestem) and wildflowers (ox-eye daisy, asters, and coreopsis) that will support a population of pollinating birds and insects, and the meadow will be a foraging area for the resident fox and red-tailed hawks, as well as other birds and small mammals.

FORCE PROVIDER DEMONSTRATION

By Mr. Michael T. Wolford

Who do you call when you have a question about the design, construction, or management of a base camp? Currently, there is no single proponent you can contact to assist with base camp issues. To fill this gap, the United States Army Engineer School has submitted a proposal to the United States Army Training and Doctrine Command (TRADOC), seeking the proponency for base camps. Assigning the proponency to the Engineer School will not mean that the engineers have all the answers to base camp issues, but it will provide one point of contact to coordinate all issues with appropriate agencies. In an effort to disseminate information, the Engineer School invited Quartermaster Corps personnel to Fort Leonard Wood in September to demonstrate a new base camp system so future base camp planners could see facilities that are available to deployed forces.

A compacted ELSS arrives on a pallet.

The Quartermaster Corps is one of the many organizations that the Engineer School coordinates with for base camp planning and design, because it owns the bed-down system the Army now uses called *Force Provider*. The original Force Provider was developed after the first Gulf War. This system is a packaged base camp that is containerized and can be deployed to support forces in any area of operation by providing billeting; a dining facility; and morale, welfare, and recreation (MWR) facilities. The Force Provider package—which also includes climate control, generators, kitchen facilities, and lighting—takes several aircraft to deploy. But now there is a new system out called the *Expeditionary Life Support System (ELSS)*.

An ELSS is capable of supporting smaller units than the Force Provider and comes in 15 triple containers (TRICONs). This system can be fitted to the deployment by adding units to house more Soldiers. One system can be transported on one C-17 aircraft and contains a kitchen, a dining facility, billeting, latrines, showers, a laundry facility, power generation, and a water reuse system.

For the Fort Leonard Wood demonstration, an eight-man team, from the only Active Army force provider company, set up all the facilities in less than four hours.

Additional capability packages can be added, to include facilities for cold weather, MWR, chapel, prime power, fuel storage and distribution, batch laundry, and a kitchen. Simple systems are usually best when deploying to contingency operations, and this system is simple to set up, operate, and maintain.

The current laundry system contains four washers and dryers that will be replaced by a commercial batch laundry system in the future. These washers and dryers are containerized and have onboard water heaters and pumps for the water supply and for removing the gray water. The showers have four shower stalls, onboard water heaters, and two sinks. The gray water removed from the showers, sinks, and laundry is sent to the water reuse system, which will treat the gray water to potable standards and store it for reuse in the showers and laundry. The system will treat thousands of gallons per day with a 75 percent recovery rate.

The ELSS generators can power the entire base camp.

It can operate for seven days without an operator present and contains a self-diagnostic system, making maintenance very simple.

The kitchen/dining facility includes a cook-and-hold oven, a steam-and-hold countertop steamer, a 6-gallon steam kettle, an undercounter refrigerator, two refrigeration units, and a griddle. The system will feed several hundred Soldiers, and can be upgraded to feed even larger camps.

Officers from the Engineer Officer Basic Course, the Engineer Captain's Career Course, and the Warrant Officer's Basic Course toured the prototype base camp and were impressed with how easily and quickly the facilities were constructed. And several general officers and brigade commanders who visited the demonstration had positive comments on the power distribution system and the waste water reuse system. Without a doubt, the Quartermaster Corps has developed an excellent system that will aid our Soldiers in the accomplishment of their mission.

The base camp water reuse system treats thousands of gallons of water each day.

Having a base camp proponent to help coordinate agencies and share information would be a step in the right direction toward solving some of the problems we are having in deployed locations. Hopefully, in the near future, TRADOC will assign the proponency to the Engineer School. If this occurs, expect new base camp training, doctrine, and concepts to evolve over the next few years. For more information about the base camp proponency, contact Michael Wolford at (573) 329-1927 or e-mail him at <*michael.wolford1@us.army.mil*>. (Also see the April-June 2006 issue of *Engineer*, pages 28-29.)

Mr. Wolford is an environmental training specialist for the Directorate of Environmental Integration at the United States Army Engineer School, Fort Leonard Wood, Missouri. He recently retired from the Army after more than 24 years of service. He holds a bachelor's in environmental science from Drury University, Springfield, Missouri, and is currently working on a master's in environmental management from Webster University, Saint Louis, Missouri.

Honoring a Patriot

By Captain Darrin W. Haas

Major General Hugh Barbee Mott, former Adjutant General of Tennessee and a hero at Remagen Bridge during World War II, devoted his life to the service of his state and country. He was an inspiration to all Soldiers, epitomizing courage, dedication, and bravery.

Born in Nashville, Tennessee, on 14 August 1920, Mott graduated from East Nashville High School in 1939, where he got his first taste of the military as a captain in the Reserve Officer Training Corps. He later attended the Marion Military Institute in Marion, Alabama, a preparatory school for all the military service academies, where he focused on attending West Point.

Mott was quickly recognized as a diligent young man, and after attending Marion Institute, the legendary General Bob Neyland elected him for a temporary job as a rodman with the United States Corps of Engineers. Mott worked on the Wolf Creek Dam from August 1940 until January 1941, while applying for entry into West Point. As war swept through Europe, young Mott gained employment at the Vultee Aircraft plant in January 1941. He worked 70 hours a week as the company raced to build dive bombers the Allies would desperately need.

Once the United States entered the war, Mott enlisted as a private in the Army on 1 November 1942. He reported to Fort Eustis, Virginia, for basic training and specialized in antiaircraft artillery. He was promoted to corporal before shipping out to Camp Davis, North Carolina, on 1 March 1943 to attend Artillery Officer Candidate School.

Quickly completing Officer Candidate School, Corporal Mott was commissioned a second lieutenant on 3 June 1943. He remained as an instructor at the facility until 10 February1944, when he transferred to the Engineer Branch and attended Engineer Basic Officer School at Fort Belvoir, Virginia.

Second Lieutenant Mott completed engineering school on 24 March 1944 and was assigned as a platoon leader in the 9th Armored Division Engineer Battalion at Camp Polk, Louisiana. As a combat engineer, Mott and his company were responsible for working directly with combat troops in numerous capacities—from construction and repair of roads and bridges, to the demolition and deployment of mines, explosives, and assorted booby traps.

Mott and the 9th Armored Division deployed for Europe on 20 August 1944 to take part in the liberation of France, landing at the beach in Normandy on 9 October1944. Through October, he moved east across France, engaging in fierce combat in the Battle of the Bulge. The Germans eventually lost ground and retreated into Germany, destroying bridges and crossing over the Rhine River to halt the American advance.

On 7 March 1945, the 9th Armored Division and now First Lieutenant Mott, who was promoted in February, arrived at the town of Remagen en route to Sinzig. Surprisingly, the Ludendorff railroad bridge across the Rhine River was still intact. As German troops were still retreating across the bridge, Colonel Leonard E. Engeman, Commander of the 14th Tank Battalion, ordered that the bridge be taken intact. He deployed his troops to attack and secure the site, soon learning that the bridge was rigged with explosives and scheduled to be destroyed within minutes.

Colonel Engeman ordered Mott, with the help of two of Mott's most reliable Soldiers—Sergeant Eugene Dorland and Staff Sergeant John Reynolds—to prevent the destruction of the bridge, which had already been weakened by German soldiers through a series of explosive charges, artillery, and mortar fire. After receiving the order to proceed, First Lieutenant Mott heroically and under fire led his team to the bridge. The Germans had blown a huge crater in the approach to the bridge, prohibiting the use of tanks, but giving some cover for the small team.

After a quick visual reconnaissance from the crater, Mott and his team raced across the entire length of the bridge, cutting the wires leading to a multitude of explosive charges, all the while under intense fire from snipers, machine guns, and 20-millimeter guns. As the teams were cutting various wires to the explosives, Mott witnessed a tremendous explosion on the far side of the bridge. He thought he might be too late, but the explosion was a minor blast that caused only some structural damage on the far side.

The team continued its mission, with Mott discovering four packages of TNT weighing 30 pounds each, as well as one 600-pound charge rigged to explode. The team disabled the charges and threw them into the river. Sergeant Dorland discovered the main cable to the explosives, but could not cut it with his pliers. Without hesitating, he shot the cable with his carbine, completely severing the line.

As the final charges were being disabled, an infantry platoon arrived to secure the bridge. Mott called for his platoon to be brought up to begin repairs on the structure in order to move tanks across. He heroically led his platoon, under heavy sniper and machine gun fire, to patch the gaping hole in the bridge planking. They worked frantically on their hands and knees to repair the damaged bridge, eventually allowing tanks to cross and ensuring the Allies an eastern foothold on the Rhine.

Mott became Commanding General of the 30th Armored Division in April 1968.

"...Mott was awarded the Distinguished Service Cross, the commendation citing his 'unhesitating action and cool courage' amid intense enemy fire aimed directly at him."

The skill, speed, and boldness of the team's successful mission won resounding congratulations and praise from high-ranking military officials. General Dwight D. Eisenhower was reported to be jubilant. General Omar N. Bradley said, "...this bold advance, characterized by able willingness to chance great risks for great rewards, speeds the day when our full forces can come to grips with the enemy."

For this heroic act, First Lieutenant Hugh B. Mott was awarded the Distinguished Service Cross, the commendation citing his "unhesitating action and cool courage" amid intense enemy fire aimed directly at him. Sergeant Eugene Dorland and Staff Sergeant John Reynolds were also awarded the Distinguished Service Cross. Officials at the time said the war was probably shortened by about six months due to the team's action, perhaps preventing 5,000 to 10,000 Allied casualties.

After the battle at Remagen Bridge, Mott continued to fiercely engage the German Army, pressing into Germany; fighting in the capture of Limberg, Frankfurt, and Leipzig; and heading into Czechoslovakia just before V-E Day. At the end of World War II, he was assigned to the Engineer Battalion of the 90th Infantry Division. He served in the Army of Occupation as a platoon leader and company commander until returning to the United States in 1946. He was separated from active military service on 9 June 1946 and entered the Reserves with the rank of captain.

Mott returned home to Tennessee after the war as a highly decorated Soldier and greatly admired individual and was soon called on to run for public office. He won election to the Tennessee House of Representatives in 1948 and served until 1951.

After three years in the Reserves, Captain Mott decided to join the Tennessee Army National Guard. On 15 March 1949, he was assigned as operations and training officer of the 173d Armored Group in Jackson, Tennessee. He quickly rose through the ranks and was promoted to brigadier general on 28 April 1964. He became the Commanding General of the 30th Armored Division in April 1968.

From 4-14 April 1968, Brigadier General Mott commanded Task Force Bravo, a force of more than 3,300 Guardsmen, during civil disturbances in Nashville following the assassination of Dr. Martin Luther King. Miraculously, without loss of life, Mott led Guardsmen, city police, and State Troopers into Tennessee's A & I University dormitories while under sniper fire. He searched and confiscated weapons and tools used previously to set fire to the Air Force Reserve Officer Training Corps building.

Mott earned his second star on 28 June 1968, and on 1 December 1968, Major General Mott was named Adjutant General for the State of Tennessee by Governor Buford Ellington. He simultaneously acted as Commander of the 30th Armored Division until February 1969. Mott worked tirelessly as Adjutant General, a post he would hold until 26 May 1971, during a period of intense civil unrest. He was released from the Tennessee Army National Guard on 31 May 1971 and worked for the National Guard Directorate until retiring from the Tennessee National Guard in November 1975.

In tribute to Major General Mott, the United States Army Engineer School, located at Fort Leonard Wood, Missouri, named the Bachelor Officer's Quarters building "Mott Hall" in his honor. The building showcases a portrait of Mott with an impressive display of his World War II exploits.

Major General Hugh B. Mott died in June 2005 at the age of 84, after spending more than 33 years in the service of his country. Tennessee Guardsmen remember Mott as a courageous patriot who always led from the front. His commitment to duty as a Soldier, public servant, and human being illustrated his impeccable character, limitless courage, and stalwart commitment to his country, Tennessee, and his fellow man.

Note: The Tennessee National Guard recently broke ground on the new Mott Armory at the Tennessee National Guard State Headquarters in Nashville.

Captain Haas, the Command Historian for the Tennessee Army National Guard, is Commander of the 269th Military Police Company. He previously commanded Detachment 1, 267th Military Police Company, and deployed to Iraq as platoon leader of the 267th. He has been mobilized for Hurricane Katrina relief, Galatin tornado relief, and a southwest border mission and spent five years as a United States Navy rescue swimmer. He holds a bachelor's in history from the Tennessee Technological University.

Engineer Update

Engineer Dog Handlers Needed! The Engineer Canine Detachment Program continues to grow. Exceptional military occupational specialty (MOS) 21B combat engineers are needed to become dog handlers and work as part of a Specialized Search Dog (SSD) or Mine Detection Dog (MDD) Team. Our Canine Detachments are a major part of the theater commander's counter improvised explosive device (IED) measures. The Engineer Regiment is constantly responding to increased requirements for dog teams in support of Operation Iraqi Freedom and Operation Enduring Freedom commanders. Interested 21Bs in the rank of specialist through sergeant must be physically and mentally capable of deploying and working independently for maneuver commanders. Handlers must be mature, articulate, assertive, and self-motivated Soldiers who have no fear of dogs. Initial screening for interested Soldiers will be conducted telephonically. The names of potential candidates will be forwarded to the Human Resources Command Engineer Branch for assignment consideration.

The points of contact are <*bernard.a.westover@us.army.mil*> (573) 544-6266 or <*robert.p.reed@us.army.mil*> (573) 563-5910.

* * *

Transition From ARTEP MTPs to CATS. The U.S. Army is in the final phase of transitioning from using the Army Training and Evaluation Program (ARTEP) mission training plans (MTPs) as a collective training tool to using the combined arms training strategy (CATS). A CATS is a unit training strategy which, as an entity, takes the entire training planning process from the cradle to the grave. A CATS is developed from a unit's base table of organization and equipment (TOE) and Department of the Army-approved mission statement. They are designed using the crawl-walk-run training model. Commanders will make the final determination as to which tasks should be trained and at what level the training should begin, since they will know their unit's training status. Included in CATS are the required training resources such as Class III and Class V materials and training aids, devices, simulators, and simulations (TADSS).

The current ARTEP MTPs that are located on the Reimer Digital Library (RDL) are scheduled to be removed from the RDL in February 2007. Once this is complete, all CATS will be located on Army Knowledge Online (AKO) on their own dedicated page. The planned end state is movement of CATS to the Digital Training Management System (DTMS) once it is fully fielded. Additionally, the Collective Training Division of the United States Army Engineer School developed a Web site on the Engineer Portal which will also have links to CATS and files available for download. The following links will take you to the AKO CATS site and to the Engineer Portal.

AKO CATS Link: <*https://www.us.army.mil/suite/portal/index.jsp*>

Engineer Portal Link: <*https://www.mwu.army.mil/portal/eng/index.php*>

The point of contact at the Engineer School Collective Training Division is <*joseph.toth1@us.army.mil*> or call (573) 563-7821.

* * *

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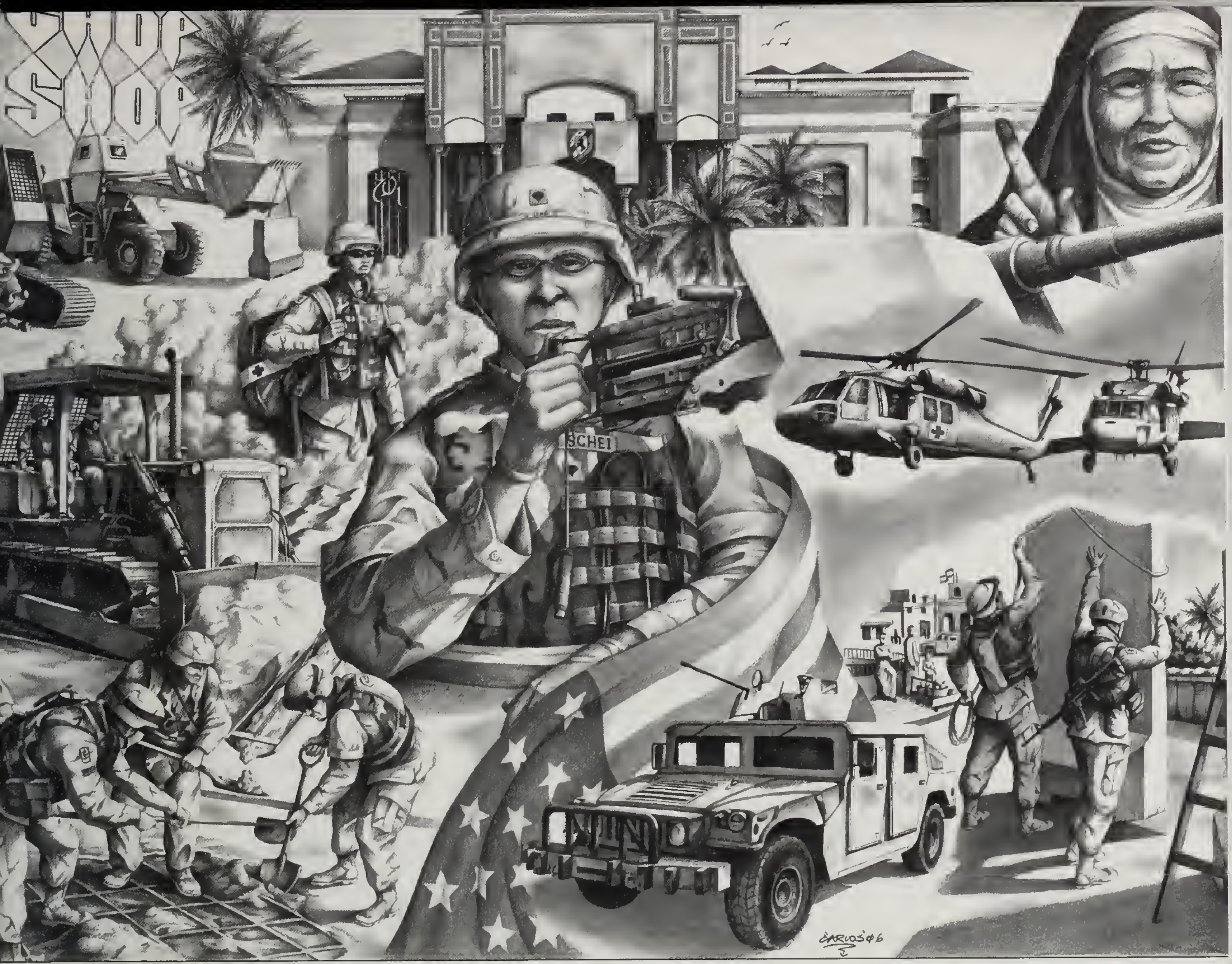

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OPERATION IRAQI FREEDOM III

94th Engineer Battalion (Combat) (Heavy)
535th Engineer Company (Combat Support Equipment)
"WOLVERINES!"
January 2005 - January 2006
Mosul, Iraq

This hand-drawn charcoal illustration was commissioned to commemorate the accomplishments of the 94th Engineer Battalion and the 535th Engineer Company during Operation Iraqi Freedom III. The focal point of the print is Sergeant Eric Schei, one of the Wolverine Warriors wounded in combat.

The artist, Staff Sergeant Carlos Arguello, is currently stationed at Fort Stewart, Georgia. This is his second commissioned print to commemorate units deployed in support of the Global War on Terrorism. His first print represented the 3d Brigade Combat Team/1st Infantry Division's deployment in support of Operation Iraqi Freedom II.

The print was unveiled on 27 October 2006 at the Fiftieth Anniversary Celebration of the Fort Leonard Wood Mid-Missouri Chapter of the Association of the United States Army (AUSA).

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Front Cover: ENFORCE 2007 — Engineers in Full-Spectrum Operations. Artwork courtesy U.S. Army Corps of Engineers®.

Back Cover: Engineer Soldiers performing vital missions.

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Clear The Way

By Major General William H. McCoy
Commandant, United States Army Engineer School

Greetings from Fort Leonard Wood to all of our Regiment's phenomenal Soldiers, civilians, families, friends, and loved ones. I'd like to begin by emphasizing how immensely proud and in awe I am with the demonstrated performance and potential of our engineer team to address and affect the spectrum of tough issues and challenges associated with training, transforming, rebasing, and caring for the Regiment while simultaneously fighting the Global War on Terrorism. It is truly a team effort that each of you has executed with the utmost professionalism, commitment, and passion despite the challenges, hardships, and resource limitations. Thank you for serving and leading during this dynamic, challenging, and rewarding time in the history of our Regiment. Your selfless and tireless service doesn't go unnoticed or unappreciated.

Our Army and Regiment are currently confronting a host of challenges associated with transforming while at war. As an example, as units address the personnel and equipment challenges associated with sourcing the operational Army, we must see through the immediate hardships and shortcomings that you consistently overcome, and focus on the long-term benefits of all your hard work. There is a lot of goodness in persevering through the challenges to achieve the end state of our Regiment. The USAES Fusion Cell efforts, which now include the Active Army and Reserve Component forces, are the pinnacle of much success. The Fusion Cell continues to serve as a key way to affect transformation, rebasing, and sourcing the war. I appreciate your participation in these efforts and ask for your continued support. I would like to recognize all the great adaptive and persistent leaders who work tirelessly to this end every day, to include notably the teams of engineers at the Pentagon, FORSCOM, and HRC who address some of the toughest issues daily. Thanks for what you do for the Regiment.

Early this summer, we will celebrate the accomplishments of the Regiment with the annual Regimental Engineer Force (ENFORCE) Conference 2007. Block your calendar dates for 20-24 May 2007, and join the engineer community's military and civilian leaders (retired and active), the Army Engineer Association, and commercial industry at St. Louis and later at Fort Leonard Wood. This conference provides Soldiers and leaders an opportunity to participate in working groups intended to identify force issues and develop solutions, exchange and disseminate critical information, build and reinforce long-term relationships, and recognize and honor the accomplishments and sacrifices of units and members of the Regiment. A spouse agenda is planned throughout ENFORCE to provide exchange opportunities amongst spouses.

Also during ENFORCE, we will dedicate the newly constructed $10 million Counter Explosive Hazards Center building in memory and honor of SFC Paul R. Smith, Medal of Honor winner, 11th Engineer Battalion, 4 April 2003. The facility provides state-of-the-art technology systems and facilities for counter IED functions and instruction of students participating in a myriad of counter IED training. This new facility absolutely exemplifies our nation's and Army's commitment and investment in safeguarding and protecting our service members. Our Regiment remains incredibly committed to this important effort to defeat this current and emerging threat to our forces.

In recent weeks, our Army experienced a spike in needless injuries and deaths of Soldiers and families, most prominently due to motor vehicle and motorcycle accidents. I urge engineer Soldiers and leaders at every level to incorporate composite risk management techniques into efforts to protect and safeguard yourselves, your Soldiers, family members, and loved ones. Wear your seatbelts at all times, follow the laws of the road, don't drink and drive, and act responsibly always. Demand and support the same with your fellow Soldiers, families, and loved ones. Our Army, nation, and Regiment need you on the team. And your families and loved ones need you in their lives. Take care of yourselves and each other.

Finally, continue to remember our Soldiers, civilians, families, and loved ones who made enormous, and in some cases ultimate, sacrifices in the service of our nation. Please commemorate and reflect on their service and sacrifices, and join me in keeping our brave deployed service members and their families at home foremost in our efforts, thoughts, and prayers.

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

Since the last Lead the Way article, I have traveled to several installations, and I truly enjoyed visiting with the Soldiers of the Regiment and being immersed in the uniqueness of the many organizations and missions we have in our branch. You can say that I'm biased, but our Soldiers are the greatest in the Army. We are blessed with talented officers and noncommissioned officers who competently lead our Soldiers through the varied and complex missions our Army expects us to execute.

ENFORCE 2007. Conference time is fast approaching, and the theme this year is *Engineers in Full-Spectrum Operations*. I hope that you are looking forward to spending this week renewing friendships and resolving issues as we focus on our full-spectrum engineering capability in support of our Army. I also want to address some issues that will shape the focus of the Council of Command Sergeants Major (CSMs) and generate what I'm sure will be lively discussion among our senior leaders.

The conference will be filled with extraordinary events and social activities in both St. Louis and Fort Leonard Wood, to include vendor displays, the Regimental review, a barbecue, an Army Engineer Association luncheon, and unit plaque dedications. The conference will culminate with the annual Regimental dinner, where we will recognize our 2007 Itschner, Sturgis, and Grizzly winners; the Honorary Colonel of the Regiment, Honorary Command Sergeant Major, and Honorary Warrant Officer; along with our Best Sapper Competition winners. I don't have to remind you of the importance of this week to our Regiment as we continue to *Train, Transform,* and *Take Care of the Regiment*, which continues to be restructured to meet the demanding challenges of the future. We truly need to hear input from the field. Among the topics covered will be ARFORGEN challenges, IED-D updates, and base camp engineering issues. The complete agenda is on the ENFORCE site of the Engineer School home page.

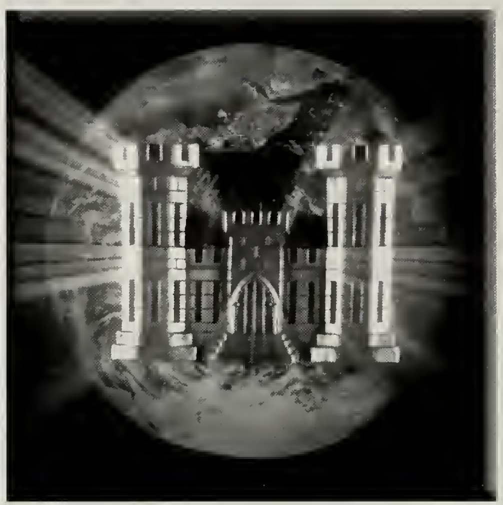
NCOES. As our Regiment continues to support the Global War on Terrorism, we still strive to provide our NCOs with the quality training they need. These courses would not be successful or relevant without well-qualified, motivated instructors and small-group leaders (SGLs). It is extremely important to fill these critical instructor and SGL positions with highly qualified NCOs just returning from operations in support of the war. NCOs returning from operational assignments, who are looking for a challenging and career-enhancing opportunity, should consider an assignment at Fort Leonard Wood.

Modularity. In January, the 11th Engineers activated at Fort Benning, Georgia, and in February the 14th Engineer Battalion converted from a Corps Wheeled Engineer Battalion to a Modular Engineer Battalion (Combat Effects). The 14th is comprised of two Sapper Companies and one Equipment Support Company. The 16th Engineer Battalion is preparing to move to Fort Hood, Texas, where it will be reflagged and become the 8th Engineer Battalion. The 5th Engineer Battalion at Fort Leonard Wood is scheduled to convert to a Combat Effects Battalion in May. It will consist of two Mobility Augmentation Companies (the 55th and the 509th), one Sapper Company (the 515th), one Forward Support Company, and a Headquarters Support Company. The 130th Engineer Brigade will relocate from Germany to Fort Lewis, Washington, in June. In October, the 29th Engineer Battalion will be reflagged to the 65th Engineer Battalion, and then the 65th and 84th Engineer Battalions will convert to the modular design.

Along with my firsthand observations, I routinely receive e-mails and calls on the great support and effort our Soldiers provide to installations and missions all over the world. I am extremely proud of all that you and our Soldiers represent. We have a common factor that's evident in all of our organizations: We are all extremely busy and feverishly working to accomplish the missions of our Army and nation. From shaping doctrine and design of our organizational mission and structure to supporting the efforts related to Operations Noble Eagle and Enduring Freedom, engineers are completely integrated and involved.

Finally, continue to focus efforts on the Global War on Terrorism, maintaining high standards and leading the way as engineers do. May God bless the fallen comrades and keep watch over our sons and daughters as we continue to fight the fight.

Essayons—Engineers Lead the Way!



Revising Engineer Keystone Manual for Full Spectrum Operations

By Lieutenant Colonel Edward Lefler and Lieutenant Colonel Barry Supplee (Retired)

Field Manual (FM) 3-34, *Engineer Operations,* which has been revised many times over the years, will soon be revised again. Last published in January 2004, the intent of this 21st edition is to update keystone doctrinal guidance for full spectrum engineer operations and support the new FM 3-0, *Full Spectrum Operations,* to be published in the near future. (FM 3-0 is one of the two Army keystone manuals; FM 1, *The Army,* is the other one). FM 3-34, the engineer keystone manual, also supports joint engineer doctrine in the upcoming revision of Joint Publication (JP) 3-34, *Joint Engineer Operations,* and serves as a reference document for commanders and staff, leaders, training developers, and doctrine developers throughout the Army and the joint, interagency, and multinational community.

Evolution of FM 3-34

While many remember that FM 5-100, *Engineer Combat Operations* (previously *Engineer Operations*) preceded FM 3-34, the full story and history behind this key reference material isn't fully known to most.

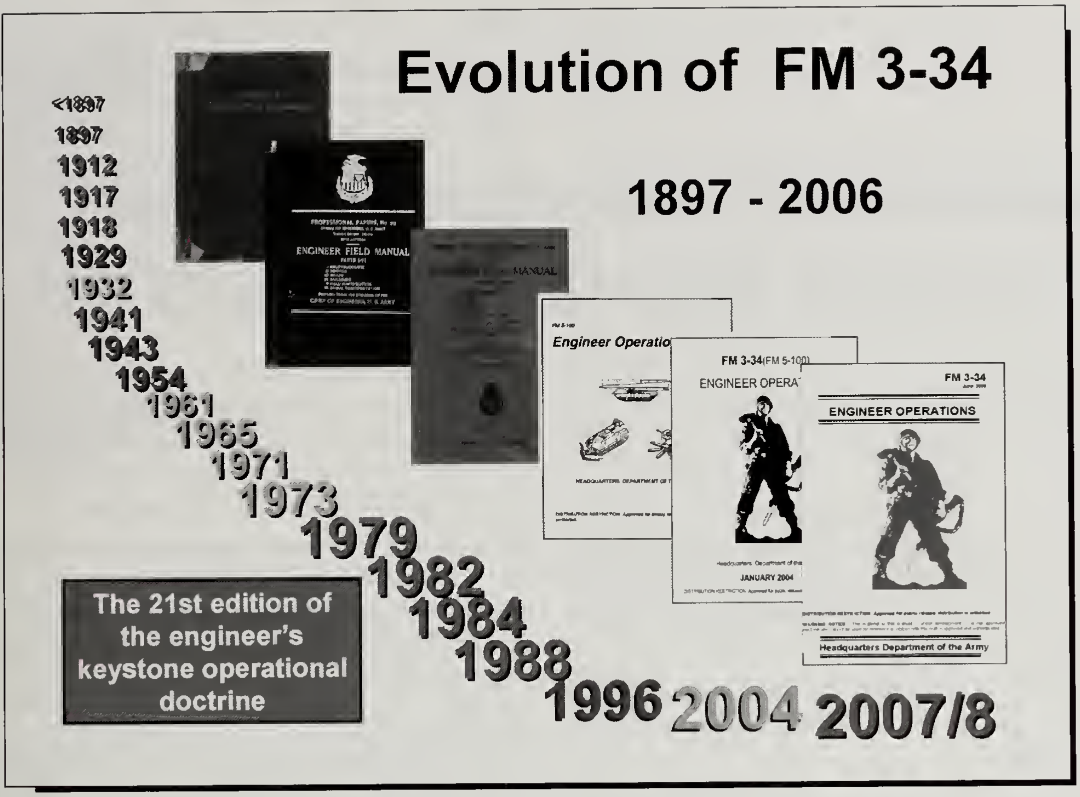
FM 3-34 was first published as the *Manual of Military Field Engineering* before 1897, and the second edition was published in August 1897. The material was prepared by the Department of Engineering at the Infantry and Cavalry School by a Captain William D. Beach, 3d Cavalry. In those days, it was printed by a civilian publishing company with the expectation that engineers would buy it at their own expense.

In 1912, it was printed as professional papers by the Chief of Engineers and simply entitled *Engineer Field Manual, Part I* through *Part VII*, and was revised in 1917 and 1918. The parts were as follows:

- I - Reconnaissance
- II - Bridges
- III - Roads
- IV - Railroads
- V - Field Fortifications
- VI - Animal Transport
- VII - Tables and Reference Data

The first numbering of the field manual (the field manual designation) occurred during the period between World War I and World War II. The August 1929 version—FM 5-5, *Engineer Field Manual, Volume I* and *Volume II*—contained information on engineer troops (Volume I) and military field engineering (Volume II). It was revised in 1932 and 1941.

Before World War II, there were very few manuals throughout the Army. The basic engineer field manual, like many others, was general in context and content. It was expected that units would train and develop their own detailed tactics, techniques, and procedures (more generally called standing operating procedures [SOPs]) to accomplish specific tasks. With the mechanization and expansion of the Army during World War II, and the lack of time for units to individually "mature" doctrinally, it was imperative that manuals become more detailed. This was when the development of specific manuals on river crossing, route reconnaissance, explosives, and demolitions began. In essence, field manuals were moving toward being more "how-to" than general in nature. Also before and during World War II, most field manuals were pocket-size with the expectation that a unit leader, officer, or noncommissioned officer would carry them around.



Being pocket-size also made it easy to keep the manual in a field locker or field desk.

In 1943, as the material grew in content and nature, FM 5-5 was split into two manuals: FM 5-5, *Engineer Field Manual: Engineer Troops*, published in October 1943, and FM 5-6, *Engineer Field Manual: Operations of Engineer Field Units*, published in April 1943. FM 5-5 and FM 5-6 were revised in May and August of 1954 respectively. In May 1961, the two manuals were combined into one again and changed to FM 5-1, *Engineer Troop Organizations and Operations*, and later revised in 1965, 1971, and 1973. In March 1979, the designation and title were changed to FM 5-100, *Engineer Combat Operations*, and it was later revised in 1982, 1984, 1988, and 1996. In 1996, the title was changed again to *Engineer Operations*. The current published version (January 2004) is still titled *Engineer Operations*, and its designation changed to FM 3-34 as the Army adopted the joint and North Atlantic Treaty Organization doctrinal hierarchy system for its numbering system.

Current Revision of FM 3-34

The Doctrine Division at the United States Army Engineer School is leading the development of the revised manual. The development team includes writers who are former engineer officers, subject matter experts from the Engineer School and around the Regiment, as well as the community of combined arms doctrine developers who review and comment on the drafts. Senior engineer leader input from across the Regiment is critical to the development of the manual.

Early in the revision process, a targeted working group of senior engineer leaders was created that provides guidance and ensures that all relevant information is identified and included. They initially corresponded through e-mail and Army Knowledge Online (AKO), but assembled with other key engineer leaders at Fort Leonard Wood in December 2006 for a Council of Colonels. The first council resulted in formulating and confirming the initial guidance for the writing team and the development of the detailed strawman for the table of contents and the program directive.

While the field manual doesn't seem that old, significant content and material changes are needed because of significant operational experience through our participation in the Global War on Terrorism, current operations in Afghanistan and Iraq, and other worldwide operations such as those in the Philippines and during Hurricane Katrina relief. Evolving policy and doctrine, coupled with joint and Army transformation that impacts on the Engineer Regiment, led to the development of the modular engineer force structure that we have converted to. Our doctrine and other key joint and Army manuals (recently revised or under revision) need to be synchronized with increasing focus and emphasis on stability, coupled with the recognition that the Army conducts simultaneous full spectrum operations. This impacts conducting multiple operations simultaneously with distinctly different objectives on forces in the field, the revised force structure and how it is employed, and the modified way that the Army conducts its operations. The battlefield operating system (BOS) construct was deleted, and Army warfighting functions (WFF) were developed, making it necessary to update assured mobility.

Because of these changes, this revision will link from the three engineer functions of combat, general, and geospatial engineering to the six warfighting functions. These functions (first introduced in FMI 5-0.1, *The Operations Process*) replace the BOS construct and link to the joint functions in the new FM 3-0, and will be reflected in a soon-to-be-revised version of FM 7-15, *The Army Universal Task List*. The revised FM 3-34 will highlight and describe the critical engineer staff integration at all echelons and the importance of functional as well as multifunctional command and control for engineer elements. The manual recognizes the transformation to a modular brigade combat team (BCT)-focused Army and describes engineer capabilities within that context. In conjunction with these changes, the manual also updates integration into the Army and joint planning processes, to include considerations in the rapid decision-making and synchronization process (RDSP).

This revision will complement and integrate other recent and ongoing doctrinal updates within the engineer doctrine proponency as follows:

- Engineer reconnaissance (FM 5-170, *Engineer Reconnaissance*, will be republished as FM 3-34.170/ MCWP 3-17.4) and the related infrastructure reconnaissance.
- Explosive hazards operations (FM 20-32, *Mine/ Countermine Operations*, will be republished as FM 3-34.210).
- Gap (river) crossing operations (FM 90-13, *River Crossing Operations*, will be republished as FM 3-90.12/MCRP 3-17.1).
- Survivability operations (FM 5-103, *Survivability*, will be republished as FM 3-34.300/MCWP 3-17.6).
- General engineering operations (FM 5-104, *General Engineering*, will be republished as FM 3-34.400/MCWP 3-17.8).
- Environmental considerations (FM 3-100.4, *Environment Considerations in Military Operations*, will be republished as FM 3-34.500/MCRP 4-11B).

These other updates to doctrine are scheduled to be complete and available on AKO within the next six months.

Framing the Revision

The December 2006 Council of Colonels validated a basic framework for the revised FM 3-34 and confirmed the soundness of the writing team's initial outline and plan for the production of this keystone document. The manual will be framed in two major parts:

Part I

Part I is focused on linking engineer operations to the full spectrum framework identified in FM 3-0 and JP 3-0 and is targeted for a combined arms audience for a better understanding of what engineers bring to the fight and how to maximize those capabilities.

- Chapter 1 answers the question "Why do we need Army engineers?" and describes the implications of the operational environment and their focused effect on engineers.
- Chapter 2 answers the question "Who provides engineering?" and describes the Regiment as well as joint, interagency, and multinational engineer capabilities. A discussion on the United States Army Corps of Engineers® (USACE) will be included.
- Chapter 3 answers the question "What are engineer operations?" and describes foundations of engineer operations, including principles, functions, integration requirements, and other primary considerations for engineers.

Part II

Part II provides more of the "how-to" of engineer operations, but remains within the framework of FM 3-0. This part is targeted more for an engineer audience and discusses specific engineer roles, functions, and techniques:

- Chapter 4 answers the question "How do we plan?"
- Chapter 5 answers the question "How do we execute (full spectrum operations)?"
- Chapter 6 answers the question "How do we sustain (our engineer elements)?"

Currently, it has been identified that ten appendixes should be developed for the manual:

- Appendix A – Civil Support Considerations
- Appendix B – Selected Combat Support Organizations and Organic Engineer Staffs
- Appendix C – Field Force Engineering and USACE Capabilities
- Appendix D – Army Engineer Organizations and Capabilities
- Appendix E – Sister Service Engineer Organizations and Capabilities
- Appendix F – Civil Affairs, Multinational, Interagency, Nongovernmental Organization, and Host Nation Considerations
- Appendix G – Contract Construction Agents
- Appendix H – Contingency Authorities and Funding
- Appendix I – Explosive Ordnance Disposal Organizations and Functions

(Continued on page 41)

The Theater Engineer Command – It's Not Your Legacy ENCOM Anymore

By Major General Robert J. Williamson and Lieutenant Colonel Adam S. Roth

A question that is constantly heard around our Regiment and our Army is, "What exactly does an ENCOM do?" Or better said, "I saw something about the ENCOMs in 'The Engineer Blast,' but what do you guys really do?" In years past, many Soldiers would quickly associate an ENCOM with conferences in the major warfighting theaters and, of course, the unforgettable catfish luncheons associated with them in Vicksburg, Mississippi, or the impressive facilities at the Argonne Laboratories in Darien, Illinois.

In the past, the two engineer commands (ENCOMs) have assumed the role of theater engineer, but primarily in support of the Army Service Component Command (ASCC) headquarters. Although a recent 416th ENCOM commander and a majority of his staff—as well as the commander of the 412th ENCOM—have deployed to Iraq during Operation Iraqi Freedom, the ENCOM has been a 226-Soldier headquarters that has not had conditions set for the mobilization of an entire ENCOM since Operations Desert Shield and Desert Storm, due to its large size and rank structure. That moniker has been relegated to the era of "your legacy ENCOM." The purpose of this article is to show—

- The unprecedented change that is occurring to both ENCOMs, as driven by a Department of the Army (DA) Initiative.
- The command and control of units for which the ENCOMs are now responsible in generating forces to support the Global War on Terrorism (GWOT).
- The evolution in support to the geographic combatant commanders (GCC).
- The leadership role that the ENCOMs are playing in the transformation of the Regiment while at war.

Background

For purposes of this article, the term "ENCOM" refers to both the 412th and the 416th ENCOMs. Although the authors are more familiar with the 412th ENCOM, many similarities may be found between the two.

The 412th ENCOM is a United States Army Reserve (USAR) unit, nestled in the historic Mississippi town of Vicksburg, along the Mississippi River. For more than a decade, it has served primarily as a wartime command and control headquarters, supporting the United States Army Europe (USAREUR) and Seventh United States Army in Germany; the Eighth United States Army (EUSA) in the Republic of Korea; and the United States Army Pacific (USARPAC), headquartered in Hawaii. The 412th provides support to the GCCs along four lines of operation:

- Enable stability operations with engineer capability
- Protect the force
- Provide engineer intelligence and knowledge management
- Sustain the force

The 416th ENCOM, based in Darien, Illinois, also a USAR unit, has primary responsibility for wartime support of the United States Southern Command (USSOUTHCOM) and United States Central Command (USCENTCOM) areas of responsibility.

Together, the two ENCOMs form the only two-of-a-kind units in the entire Army force structure. Both units are under the operational control (OPCON) of the United States Army Corps of Engineers® (USACE) through a formal Memorandum of Agreement. Both ENCOMs supported hurricane relief under USACE in the wake of Hurricane Katrina, through the Mississippi Valley Division, in both Louisiana and Mississippi. That relief work, and support to Emergency Support Function 3 under the National Response Plan, continues to this day.

TEC Transformation

In close cooperation with USACE as the lead agency, the ENCOMs are actively engaged with the United States Army Engineer School to implement DA Initiatives 18, 23, and 24:

- Initiative 18 is to establish and provide base operations capabilities to support the operational Army in a contingency environment.

- Initiative 23 is to establish a theater engineer element and the processes needed to plan, train, and deploy in support of an ASCC.
- Initiative 24 institutionalizes and improves the responsiveness and readiness of civilian capabilities in support of the ASCC.

Both ENCOMs—in conjunction with USACE—have exercised the implementation of those initiatives through the Castle Quest series of exercises held in the National Capitol Region. The Castle Quest exercise is a tabletop scenario based in a joint, interagency, and multinational (JIM) environment. Once approved, DA Initiative 23, *Theater Engineer Command (TEC)*, will transform both commands from the legacy-based ENCOM structure to a TEC.

Each of the respective commodity areas are represented in the legacy force structure (G1-G8). The challenge has always been, as has been the case with much of the Regiment's force structure, that the United States Army Forces Command (FORSCOM) would either have to mobilize the entire command for a contingency or create a derivative unit identification code for a unit that may possess only a portion of the ENCOM's capability. Currently working through the force development update (FDU) process, DA Initiative 23 would serve to formally establish the TEC, replacing the former ENCOM organization. The TEC will have a main element of approximately 99 Soldiers, commanded by a major general, to form the nucleus for force generation. The main element serves as a platform for command and control for two deployable command posts (DCP) each consisting of roughly 62 Soldiers. The DCPs are led by a colonel or potentially a brigadier general, depending on the factors of mission, enemy, terrain and weather, troops and support available, time available, and civilian considerations (METT-TC). Under the DCP, the staff is aligned in effects-based groupings of combat, construction, and sustainment effects. This new modularity allows the TEC to be deployable in smaller subsets, while maintaining scalable capability in support of the warfighting commander.

The DCP can assume command and control of various specialty "plugs" that it would receive from USACE, such as a contingency real estate support team (CREST), one or more forward engineer support teams (FESTs), or other modified table of organization and equipment (MTOE) units such as a facility engineer detachment or a construction management module. This structure further demonstrates its flexible tailorability to match the requirements of a given contingency. Having two DCPs in each of the ENCOMs provides the ability to either engage at two separate echelons of command simultaneously, such as at the GCC and ASCC levels, or to provide four total DCPs that could be placed in the Army Force Generation (ARFORGEN) Model and deployed in phases. The TEC concept is continuing the FDU process and has already received input from all Army major commands, as well as the Engineer School, USACE, and the 412th and 416th ENCOMs. A decision for the final composition will be made soon.

Command and Control in CONUS

The 412th ENCOM, under the United States Army Reserve Command (USARC), is playing a key role in Army Reserve Command and Control (ARC2) transformation. USARC, under its Millennium Transformation Plan, is standing down the majority of its two-star peacetime command and control headquarters, called regional readiness commands (RRCs), in support of creating four regional readiness sustainment commands (RRSC) across the country.

These RRSCs will be responsible for the base operations functions for all units within their geographic footprint. The units once commanded by the RRCs will now fall under operational and functional commands, that share both a Title X support mission to their respective downtraces as well as a responsibility to maintain their own go-to-war mission. Consistent with the USARC Transformation Plan, the 412th ENCOM is considered an operational command—essentially a senior USAR command headquarters with both engineer and nonengineer units assigned. The driving reason for the shift in emphasis on the USAR operational and functional commands is to ensure training and readiness oversight (TRO) of Soldiers with similar missions, as well as the efficient mobilization of its community-based, skill-rich Soldiers and units to support the joint warfighters whenever needed—anywhere in the world.

As one of the first senior USAR operational and functional commands to lead the USARC transformation, the 412th ENCOM assumed command and control of the new 926th Engineer Brigade on 1 October 2006. The 926th, headquartered in Montgomery, Alabama, also is transforming from a legacy engineer group structure to a brigade during this transition. The concurrent restructuring of the 926th, while shifting senior command relationships and assuming command of seven new USAR engineer battalions during a time of war, further exemplifies the true nature and depth of transformation within our Regiment. The 926th's USAR span of control extends from West Virginia to Florida, and west to the Mississippi River.

The 412th ENCOM will also assume command and control of two additional brigades by the end of this fiscal year. As of 1 October 2007, the 411th Engineer Brigade—based in New Windsor, New York, and currently deployed in support of Operation Iraqi Freedom with four battalion equivalents—will fall under the 412th ENCOM umbrella. The 412th will also stand up the 302d Combat Support Brigade (Maneuver Enhancement) (CSB [ME]) at Westover Air Reserve Base in Massachusetts. The 302d CSB (ME) will contain at least three battalion equivalents, including an engineer battalion, a chemical battalion, and a military police battalion. The geographic endstate of the 412th ENCOM footprint will extend from the tip of Maine to the tip of Florida and west to the Mississippi River. Similarly, during mid-January 2007, the 416th ENCOM assumed OPCON of the 420th Engineer Brigade in Bryan, Texas, and will soon provide command and control for an additional USAR engineer brigade and virtually all USAR engineer units west of the Mississippi River.

"The 412th ENCOM is forging strategic alliances...to anticipate requirements necessitated by transformation and focus targeted individual and collective training requirements on a command-wide scale."

Force Generation and GWOT Support

The headquarters of both ENCOMs have provided modules of task-organized Soldiers at the operational level in support of the GWOT since the start of the campaign. Soldiers from the 412th headquarters have supported USAREUR, operating as the Office of the Deputy Chief of Staff, Engineer (ODCSENGR), in multiple rotations. Additionally, the 412th has deployed its Soldiers to support several rotations for the Multinational Force–Iraq, and continues to support the USACE Gulf Region Division and its subordinate districts. The 412th will continue to provide these modular capabilities while performing its ARC2 command and control responsibilities. The 416th ENCOM is currently preparing to mobilize Soldiers from its headquarters to replace Soldiers from the 412th supporting the Gulf Region Division headquarters in Iraq.

As previously stated, under the new ARC2 arrangement, the ENCOMs will be responsible for TRO of their downtrace units as they progress through the ARFORGEN cycle. The 412th ENCOM, in conjunction with the 416th ENCOM and USARC, are jointly developing challenging gate exercises as units leave the *Reset/Train Pool* and enter the *Ready Pool* through certification in a warrior exercise (WAREX). The 412th ENCOM currently has responsibility for the only USAR validation exercise, Operation Sand Castle (OSC), at the National Training Center at Fort Irwin, California. This gate is for units to leave the *Ready Pool* and enter the *Available Pool.* OSC has seen a fourfold increase in USAR exercise units, now currently at 35, and spans the full spectrum of combat support and combat service support unit employment.

The training organizations within the USAR are also undergoing a total reorganization. The training organizations will focus on three areas in the future:

- Initial-entry training
- Total Army School System for duty military occupational specialty (MOS) – qualified (DMOS-Q)
- Leader development

The 412th ENCOM is forging strategic alliances with these organizations to anticipate requirements necessitated by transformation and focus targeted individual and collective training requirements on a command-wide scale. The 412th ENCOM is engaged with the Engineer School to help develop an engineer-specific training support brigade, which will further facilitate the ENCOM's TRO mission.

The "take away" is this: If a USAR engineer unit is required for future contingencies, it will have been trained and deployed under either the 412th or the 416th ENCOM's TRO mission.

GCC Support

The 412th ENCOM has maintained habitual associations with USAREUR and Seventh Army, EUSA, and USARPAC, as the 416th ENCOM has done with the Third United States Army. Most of our associations have remained with the ASCC in support of theater security cooperation planning (TSCP); however, as we move toward joint operations, the 412th has engaged at the joint headquarters level and will continue to do so in the future.

PACOM

The 412th ENCOM has transformed its engagement in this area to a regional approach, as has the GCC we support. As a result, our Hawaii forward element and Korea forward element are merging under a single command and control element.

Korea

The 412th ENCOM will continue its habitual association with Korea-based missions and the exercises that support it, to include Reception, Staging, Onward Movement, and Integration/Foal Eagle (RSOI/FE) and Ulchi Focus Lens. The deputy commander of the 412th ENCOM is also dual-hatted as the EUSA engineer, further showing our connectivity with our supported command. Whereas in the past we have exclusively supported the ASCC EUSA, the 412th has also identified potential contingency theater engineer synchronization requirements to support laterally the Joint Force Support Component Command (JFSCC) under United States Forces Korea (USFK), as assisted by United States Joint Forces Command (USJFCOM).

Pacific Rim

Just as the 416th ENCOM has done in Central America, the 412th ENCOM has supported humanitarian construction exercises throughout the Pacific Rim under USARPAC. Exercise Talisman Saber, a joint rapid airfield construction (JRAC) mission, will be executed this year in Australia with support from the 412th. USAR Soldiers and units will train during Exercise Khan Quest, which will include vertical construction missions in Mongolia. In the past year, the 412th has supported the GCC TSCP through exercises in Vietnam, the Philippines, and Thailand, among others.

EUCOM

The 412th ENCOM has recently formalized an agreement with EUCOM that will provide engineer planning to support TSCP missions for the EUCOM J4 engineer, while simultaneously supporting the ASCC USAREUR. Elements of the 412th continue planning with the United States Special Operations Command, Europe (SOCEUR), for a vertical construction project scheduled for execution this fiscal year in Africa. Last year, elements of the 412th supported overseas deployment training for a water distribution mission in Angola. Construction missions will continue to support the Joint Multinational Readiness Center at Hohenfels, Germany, as well.

Transformation While at War

Nearly 100 percent of the 412th ENCOM downtrace will modularize within the next 18 months. Both ENCOMs, in conjunction with the Engineer School, are participating in a Fusion Cell, modeled after the Active Army Fusion Cell, to address transformational issues that arise in this truly dynamic period in our history. Participants in this forum will include all major players in the manning, equipping, funding, structuring, and training of units during their conversion. Major issues are vetted by the Engineer Advisory Board, which is chaired by one of the two ENCOM deputy commanders and has senior-level participation from major subordinate engineer commands, USACE, the Engineer School, and the United States Army Maneuver Support Center (MANSCEN).

Doctrine and New Technology

The ENCOMs, in conjunction with the Engineer School and USACE, have actively participated in the revision of several joint publications, to include JP 3-34, *Joint Engineer Operations*. As more and more engineer leaders return to the command with recent combat experience, the ENCOMs will have a greater ability to contribute to the revision of engineer doctrine by synchronizing the experience of a multitude of different types of units within each ENCOM's downtrace and other engineer units.

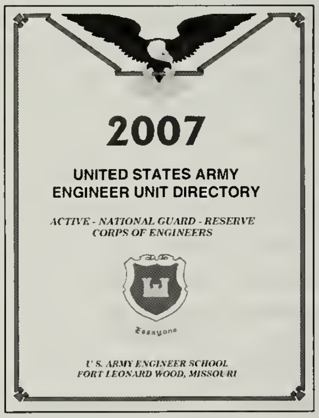
The 412th ENCOM has served a critical role in technology transfer that has directly benefited the warfighter on the ground. Through the Joint Forward Operating Base handbook and related video teleconferences that address both operational and technical aspects of the Joint Contingency Operating Base strategy, the 412th ENCOM, in conjunction with USACE, has provided a key role as knowledge manager to support the efforts of the Joint Staff. The 412th maintains key relationships with various agencies, including the Joint Improvised Explosive Device (IED) Defeat Organization (JIEDDO). This unique relationship has provided the most challenging training opportunities using current tactics, techniques, and procedures for deploying units participating in OSC. Key elements of operational protection will additionally be exercised during this year's OSC exercise at Forward Operating Base Santa Fe, at the National Training Center.

Summary

The anticipated transformation of both the 412th and the 416th ENCOMs to TECs, coupled with new command and control missions, support of force generation, evolving support to the GCCs, leadership in transformation to modularity while at war—while playing a key role as a warfighting theater contingency clearinghouse for engineer capability and support for both doctrinal and technology transfer—should demonstrate that it's not "business as usual." The current ENCOM is truly "not your legacy ENCOM." The ENCOMs of the future look forward to our mutual efforts among all components to support the needs of the warfighting commands through unity of effort throughout the Regiment.

Major General Williamson is the Commander of the 412th Engineer Command. He served in Iraq concurrently as the Deputy Chief of Staff, Engineer, for the Multinational Force-Iraq and as the Director of Operations for the Iraq Reconstruction Management Office in Baghdad. He has commanded at the battalion and group levels and served as the Deputy Commander of the 416th Engineer Command. He is a graduate of the United States Military Academy and the Army War College and holds a master's in operations management from the University of Arkansas.

Lieutenant Colonel Roth is the Deputy G3 of the 412th Engineer Command. He has deployed to Iraq as the Executive Officer of the 458th Engineer Battalion and has commanded a combat heavy engineer company. He is a graduate of the Command and General Staff College and holds a master's in mechanical engineering from Boston University.



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TRO

Clarifying Roles and Responsibilities

By Colonel Duke DeLuca, Lieutenant Colonel Fred Kaehler, and Lieutenant Colonel Robert T. Morgan

It seems that at every other videoteleconference (VTC) you attend these days you hear "Title 10, Title 10, who's got the Title 10 responsibility?" Or here's another one: "Well, if the commander who is tasked with training and readiness oversight (TRO) of a subordinate functional unit deploys, then he can either turn TRO over to the senior mission commander (SMC) at that remote post or designate an acting TRO commander, with the United States Army Forces Command (FORSCOM) approving the plan."

Is it possible to have missed an entire semester at Command and General Staff College (CGSC)? Paradigms are clearly shifting. What would happen if somebody gave a pop quiz at one of these meetings? Name three or four Title 10 responsibilities—Go! The scores would likely be abysmal. So like any good staff officer, it's off to Google™. But this time, the answers are not so easily found.

The term *Title 10* is short for Title 10, United States Code (USC). If you wade through the USC online, it's fairly daunting—lots of verbiage and no CliffsNotes®. It soon becomes apparent that a tutorial or guidebook would be extremely useful. FORSCOM has now published a Command and Control (C2) Reference Pamphlet to assist in strategic communications for the FORSCOM Modular Force C2 Plan.

At the 20th Engineer Brigade (Combat) (Airborne), Fort Bragg, North Carolina, we had to get smart quickly. In early March 2006, we received the attachment orders for a newly activated battalion at Fort Knox, Kentucky—the 19th Engineer Battalion—increasing the brigade's span of control to four engineer battalions. The 20th Engineer Brigade commander was given TRO authority of this unit.[1] Further dialog with FORSCOM revealed that two additional battalions were coming in October 2006—the 7th Engineer Battalion at Fort Drum, New York, and the 326th Engineer Battalion, Fort Campbell, Kentucky. It was clear that brigade staff officers had to become subject matter experts on administrative control (ADCON)/Title 10 and more specifically on TRO (a subtask of ADCON/Title 10) to successfully define our role with these three geographically separated battalions.

On 6 September 2006, FORSCOM issued the executive order (EXORD) for the Modular Force C2 Plan. This was the Rosetta Stone document that we were searching for, and Annex J: Terms of Reference, was a helpful section. Never mind that some of the terms had *predecisional* in parenthesis, we now had details for each term and a helpful listing of TRO responsibilities needed to identify the oversight of three geographically separated battalions. Select pages from this helpful reference quickly appeared in leader books throughout headquarters.

On page J7 of the annex, these TRO responsibilities are listed:

1. Provide training guidance and approve training programs.
2. Assess state of training and provide training direction.
3. Assess manpower, equipment, and training resource requirements; coordinate the obtaining of needed resources.
4. Provide mission essential task list (METL) guidance and approve the unit's METL.
5. Receive and review unit readiness reports (USRs).
6. Manage military personnel and equipment, including the authority to cross-level between colocated, assigned, or attached units. Cross-leveling between installations will be directed by FORSCOM.
7. Establish a priority for resources (allocation) among assigned or attached units.

We can also cross-reference the listing against SMC responsibilities (installation commander in some cases) as it pertains to the three remote battalions. These are the ADCON-related (ADCON (-)/Title 10) responsibilities (also found on page J7):

1. Personnel services; morale, welfare, and recreation (MWR)/well-being; legal (including disciplinary authority unless specified otherwise); inspector general; public affairs; religious (chaplain); provost marshal; information management; contracting; installation engineer services; and resource management support.
2. Weapon and equipment sustainment and repair (above unit level).
3. New systems fielding and major end item distribution (but not allocation); SMCs, installation commanders, or garrison commanders exercising ADCON(-)/Title 10, minus training and readiness oversight (may not cross-level FORSCOM personnel and equipment unless directed by FORSCOM).
4. Providing base support operations, to include training enablers such as ranges, maneuver areas, training aids, simulation facilities, and training ammunition.

With this outlined, the responsibilities of the SMCs for the three newly assigned battalions were defined:

- 7th Engineer Battalion: Commander, 10th Mountain Division
- 19th Engineer Battalion: Commander, U.S. Army Armor Center and Fort Knox, Kentucky
- 326th Engineer Battalion: Commander, 101st Airborne Division (Air Assault)

Given the myriad of tasks a battalion faces daily, weekly, and monthly, a good bit of analysis and common sense was still required to decide which commander would take the lead on a given topic.

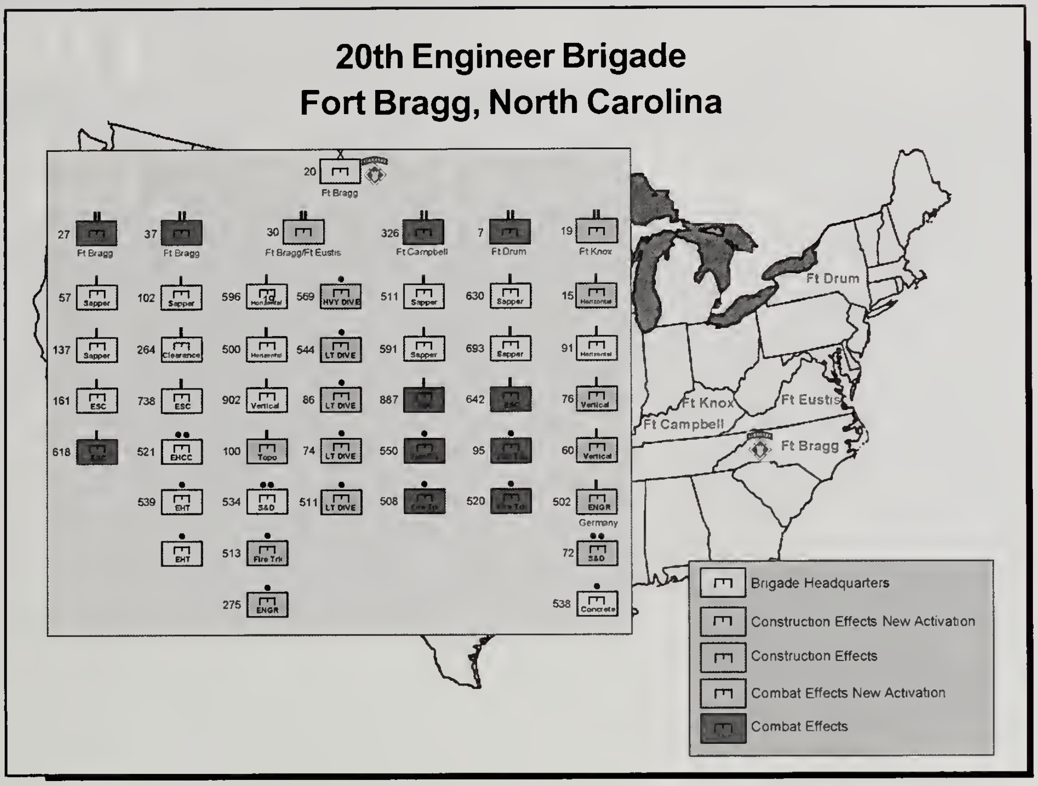
The table below shows only a few of the topics that need to be looked into to define the lead commander for a given area. It is evident that both the SMC at the installation of residence and the functional brigade commander with TRO have a vested interest in the subordinate functional unit, and as such, the brigade commander has coordinating authority with the particular SMC. The 20th Engineer Brigade staff continues to formalize the working relationship and TRO of three remote subordinate battalions, as well as a provisional dive company at Fort Eustis, Virginia. Army command policy, Army regulations and, potentially, memorandums of agreement with the SMC's subordinate chain at the remote installation will result in a common understanding of responsibilities.

To further complicate this challenge, the brigade headquarters is slated to deploy for an Operation Iraqi Freedom rotation. FORSCOM has already anticipated this scenario and has provided guidance for transferring TRO duties during deployment. The bottom line is that interim TRO responsibilities will always reside with a FORSCOM operational commander. Engineer brigade commanders in the continental United States have agreed informally that

Defining the Lead Commander

Area of Concern	Responsible Commander	Remarks
Doctrine	TRO commander	
Training	TRO commander	The SMC on the installation of residence provides training enablers to support the unit's approved training plan based on ARFORGEN-informed priorities for all units on the installation.
Leader development	TRO commander (in the rating chain of the battalion's officers and noncommissioned officers)	The SMC will be the battalion commander's senior rater[2].
Organizational requirements	TRO commander and SMC	Facility needs are the responsibility of the SMC, but the TRO commander might assist in sourcing solutions with certain equipment needs.
Materiel	TRO commander and SMC	The SMC fields new equipment; the TRO commander cross-levels and lateral-transfers equipment.
Personnel (manning and evaluations)	The SMC has the lead in identifying and sourcing shortages, with TRO commander input and coordinating authority.	Subordinate units at remote installations will incorporate both SMC and TRO commander input into the commander's rating chain[3].
Facilities	SMC	
Budget	SMC (resourced by the installation)	The TRO commander can weigh in with additional requests for funding if the unit isn't resourced adequately.
Unit status report (USR)	SMC (formally through the installation up to the Department of the Army [DA])	The TRO commander gets a copy and incorporates it into the integrated brigade USR.
Ammunition	TRO commander (responsible for forecasting and ordering) and SMC (responsible for resourcing)	Hired contract support maintains fleet at full mission capability (FMC) in low-usage maintenance program or entry into United States Army Materiel Command (AMC)-managed load-bearing equipment (LBE) program.
Equipment left back while a unit is deployed	SMC	
Reenlistment goals and progress	SMC and TRO commander (per FORSCOM mission goals and guidance, both should maintain visibility)	Currently some subordinates have mission goals from their SMC/installation.
Legal	SMC	A personnel action that requires SMC oversight and is also driven by Army command policy.

retaining TRO while deployed is the best option, given the difficulties of building staff linkages and training a new unit, its personnel, and its challenges. This is an Army Force Generation (ARFORGEN) Synchronization Conference action, and choices include passing interim TRO to the local SMC, another engineer brigade headquarters, or a combination. Following the mission sourcing subconference, the FORSCOM G-3 Plans Division will develop courses of actions and get the FORSCOM approval for a FORSCOM commander to perform TRO for those identified units. The final decision is briefed at the ARFORGEN General Officer Steering Committee and codified at the ARFORGEN Synchronization Order (ASO) (who, where, and when). The 20th Engineer Brigade will provide input to this process.



The 30th Engineer Battalion will function as the brigade's rear detachment headquarters during the headquarters' deployment. As such, it will continue to work and rectify several unresolved issues in the brigade.

One of these issues is ordering equipment and material for deployed units. The 19th Engineer Battalion was activated and then deployed before its modified table of organization and equipment (MTOE) was fully issued at Fort Knox, but its equipment shortages were overcome by getting a large amount of theater-provided equipment (TPE) in Iraq. Since the 19th's rear detachment is a derivative unit identification code (UIC), and a low priority due to not being a deploying unit, it faces lengthy equipment delivery times for its shortages. So the 19th can reset and retrain without waiting for shortages to be ordered and delivered, we continue to work sourcing solutions with the XVIII Airborne Corps, FORSCOM G-4, and item managers. Additionally, the brigade S-4 rear continues to work interpost and internal brigade equipment transfers to source some of the equipment shortages in the 19th Engineer Brigade and in the activating 7th and 326th Engineer Brigades.

Today's plan will likely be modified over time. We recently learned that one of the brigade's battalions might inactivate. But throughout, the brigade motto will ring true—*Building Combat Power!* It has taken on a new meaning, as deployable and lethal modular units are formed every day.

Endnotes

[1] In this article, the term "TRO" is used as defined by Annex J of the FORSCOM EXORD and focuses on the Active Army/Active Army training relationship, as opposed to the Department of Defense TRO definition referenced in Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, which reflects the Active Army/Reserve Component relationship.

[2] Per FORSCOM guidance, as long as the SMC chain is also a FORSCOM subordinate, the 19th Engineer Battalion commander at Fort Knox will have a revised rating chain from this example, since he resides on a TRADOC installation.

[3] Ibid.

Colonel DeLuca is the Commander of the 20th Engineer Brigade at Fort Bragg, North Carolina. He has had numerous troop assignments and has deployed to Iraq twice, first as the 326th Engineer Battalion commander and most recently as the Multinational Security Transition Command–Iraq C7. The 20th Engineer Brigade will deploy again for Operation Iraqi Freedom 07-09 as the Multinational Corps–Iraq theater engineer brigade.

Lieutenant Colonel Kaehler is the Deputy District Commander of the Chicago District, United States Army Corps of Engineers®. He was the Deputy Brigade Commander of the 20th Engineer Brigade and the Deputy Brigade Commander for the brigade's Operation Iraqi Freedom 04-06 deployment.

Lieutenant Colonel Morgan is the Assistant Corps Engineer, XVIII Airborne Corps, Fort Bragg, North Carolina. He was the Multinational Corps–Iraq Deputy C7 during Operation Iraqi Freedom 04-06 and previously served as the Combined Joint Task Force-180 Deputy C7 during Operation Enduring Freedom.

IEDS: The Obstacle in the Path to Assured Mobility

By Brigadier General Michael J. Silva

Engineers have traditionally been the vanguard in breaching obstacles and clearing the path for armies to advance. The term *sapper* evolved from the use of engineers to dig what the French termed a *sappe* (trench), using a technique developed for digging trenches that allowed the opposing force's artillery to move forward in the attack to undermine a fortification. Sappers became known for their ability to bypass fortifications or to demolish them, thus the engineer ability to clear a path or breach an obstacle.

Today, engineer route clearance teams (RCTs) are doing the hero work in assuring mobility for combat logistics patrols (CLPs) and the movement of other coalition forces on the roadways. The obstacle encountered today is typically an improvised explosive device (IED). Engineers man the Buffalos, Huskys, RG-31s, and other vehicles as they set out to find the IEDs before they detonate on coalition force vehicles. This protection mission has further proved the value of engineers in the fight. Once engineers locate an IED, they turn the mission over to explosive ordnance disposal (EOD) teams, who have extensive training in ordnance and explosives, having completed an eight-month certification course for their military occupational specialty (MOS) qualification. As long as EOD personnel are embedded within the route clearance mission, they are clearly the best trained Soldiers, Sailors, Airmen, or Marines to detonate IEDs.

Engineer Explosives Training

Engineers do not have a certifying explosive ordnance course. Does that mean that they are not trained on explosives? Certainly not. When one reviews the program of training on explosives that combat engineers have, one might ask, "Why can't engineers detonate IEDs?"

Engineers begin their combat engineering training at the MOS 21B10 level, with basic tasks such as how to neutralize booby traps, construct firing systems, prime explosives, construct demolition initiating systems, and identify characteristics of demolitions and explosives. Over the years, the MOS 21B20 and 21B30 levels of explosives training build on the mastery of skills with successively more complex training; calculations; and knowledge of explosives, ordnance, blast effects, and different target disposal techniques.

Like the enlisted and noncommissioned officer (NCO) ranks, engineer officers learn about explosives and demolitions with a successive training regimen taking place over several years, beginning with their Engineer Basic Officer Leader Course and followed by platoon leader time as a combat engineer. Perhaps the most extensive and intensive demolitions and explosives training occurs for those attending both the Explosive Ordnance Clearance Agent (EOCA) Course and the Sapper Leader Course, which has live demolitions exercises as a part of the curriculum.

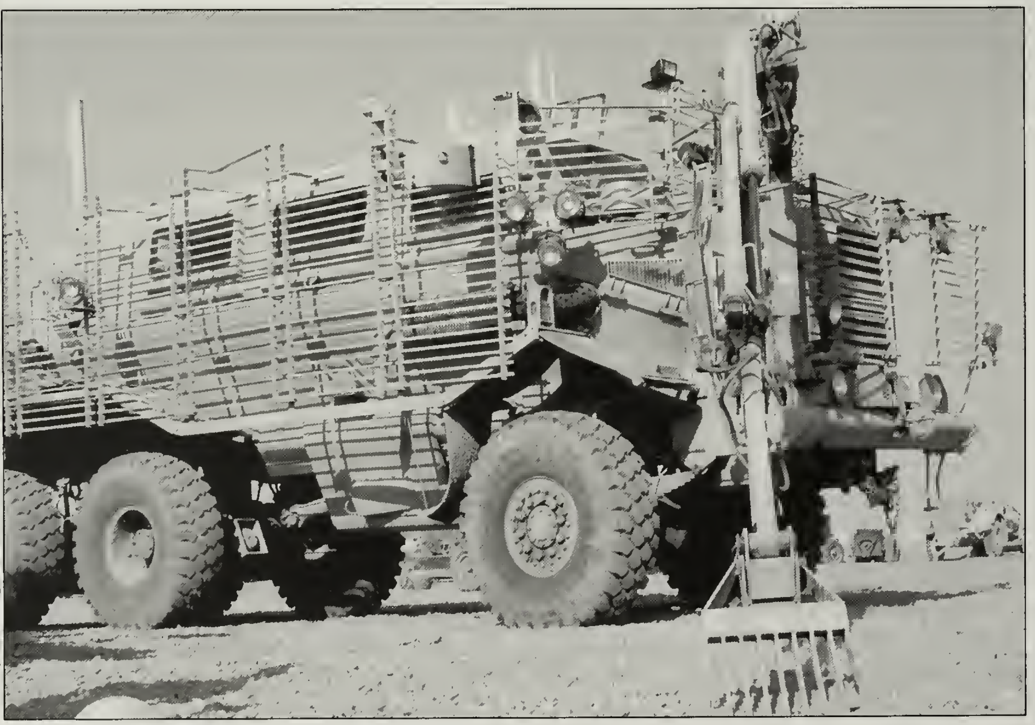


Photo by Staff Sergeant Chris A. Durney

The Buffalo's robotic arm is used to investigate and clear IEDs.

Finding an IED

Even though combat engineers train over the years on explosives and demolitions, are they trained enough? What happens when they find an IED?

There are many tactics, techniques, and procedures for RCTs and many different techniques and vehicle configurations for the route clearance patrol. The purpose of this article is not to discuss those differences, but to generically describe the actions typically performed once an IED is found and needs to be cleared.

When the team members in the lead vehicle of the route clearance patrol spot a possible IED on an improved road, the patrol comes to a halt. While there are various initiators that require different responses by the RCT, the first action is to scan for secondary devices and assess the environment. The RCT looks for other possible IEDs nearby, particularly checking for wires or trigger devices. The next step is to interrogate the possible IED, typically by using the mechanical arm on the Buffalo. Once an IED is confirmed, a description of the IED—which may be a full description, to include the type of round, number of rounds, and initiation system that is configured—is radioed to the EOD vehicle, which could be anywhere in the patrol. Again, all personnel scan around their vehicles for secondary devices or booby traps. The EOD team then deploys a TALON® robot from their location and navigates it toward the IED. A camera mounted on the robot can be used to allow them to confirm the engineer assessment, but the robot generally moves forward and places an explosive charge on the IED and, once the patrol is at a safe distance, blows the IED in place.

A Soldier prepares a TALON robot for use during a route clearance patrol.

On those specific occasions where remnants are collected after the controlled detonation, engineers scan around their vehicles before any personnel, including the EOD team, are allowed to dismount. On the vast majority of sites, the EOD team uses the robot to collect remnants, if they collect any at all. Dismounting the armored vehicles is a last option.

This coordinated effort between engineers and EOD personnel works great in the combined effort to clear the IED obstacle from the roadway and render safe the passageway for coalition forces and CLPs. However, if EOD personnel are not embedded, the system breaks down, creating inefficiencies and increased risk. Especially in urban areas, the risk of direct attack via small arms fire or rocket-propelled grenades increases when too much time is spent in one location.

Gathering IED Evidence

Engineers have the training, knowledge, and ability to detonate IEDs, and they can identify munitions and refer to the same or similar manuals as those used by EOD personnel (such as Navy or Air Force manuals). Engineers even have some of the TALON robots that are used to place the explosive charge on the IEDs. But an objection sometimes raised regarding engineers detonating IEDs is that they do not have the knowledge, experience, or training to gather the sensitive forensic evidence necessary to attack the IED network and get to the bomb maker.

First, not all IEDs are worthy of evidence collection, and the most basic IEDs are typically blown by EOD personnel without any attempt to collect evidence. In fact, there may be a 90/10 rule here, where less than 10 percent of IEDs are exploited for evidence.

Second, this argument is not fully sound when taking into account civilian skill sets of Reserve Component Soldiers. Many of them are civilian law enforcement personnel who bring invaluable experience to the route clearance mission due to their training in evidence collection and processing. Such skill sets should be used as an enhancement to mission accomplishment. These men and women work hard every day to take "bad guys" off the streets and know that the slightest mistake in evidence collection and handling may allow a criminal to go free. By tapping into these skills, the Reserve Component RCTs may be best outfitted for forensic evidence collection in the absence of trained EOD personnel.

Conclusion

Engineers spot, interrogate, and confirm IEDs and scan the area for secondary devices or other dangers to the situation. They have the proper manuals to assist in munitions

(Continued on page 23)

CEHC Support to COIN Operations

By Mr. Dorian D'Aria

The events of the past five years have underlined that the United States and its allies confront a very different operational environment from the relatively peaceful and calm environment that so many predicted in the aftermath of the Cold War. In such a brief period, our military has been challenged on multiple levels, throughout the total spectrum of war continuum, which has accelerated change within our military that previously would have taken decades to effect.

Within a single tour of duty, many Soldiers and units have experienced everything from the initiation of war and conventional combat operations, through the transition to asymmetrical warfare and counterinsurgency (COIN) operations, as well as nation building and peacekeeping efforts. These unprecedented demands have challenged previous doctrinal and operational concepts, stressed existing processes, and highlighted the need for the rapid insertion of technological and procedural applications.

These challenges are readily reflected in the development or revision of doctrinal field manuals, the creation of focused organizations to streamline change, the rapid fielding of unique technological systems and capabilities, plus continuously evolving tactics, techniques, and procedures (TTP). Some of the organizations specifically created to address these requirements are the Joint Improvised Explosive Device (IED) Defeat Organization (JIEDDO), the Asymmetrical Warfare Organization (AWO), the United States Army Training and Doctrine Command (TRADOC) IED Defeat Integrated Capabilities Development Team (ICDT), and the Counter Explosive Hazards Center (CEHC).

COIN Environment

What has become extremely evident is the multidimensional aspect of modern warfare, consisting of numerous independent actions simultaneously occurring within the operational environment, many of which have both local and strategic implications. In today's operational environment, asymmetrical warfare and COIN are as much a part of modern combat as mounted and dismounted maneuver. Plus, the objectives and methods of each are so intertwined that they can become indistinguishable and mutually supportive. Combat operations conducted against an aggressive and merciless enemy for its tactical benefit must also consider its impact on COIN objectives. It becomes a balancing act of measured force to accomplish the goals of the mission without creating an environment of greater public dissatisfaction that fertilizes sympathy for our enemy and loses support from the populace. This manifestation has even driven change and adaptation from the highest strategic and operational level down to the tactical level and the individual Soldier.

A suicide bomber prepares to strike.

COIN is a complex fight and is more a war over people than a war over terrain. It involves a balancing act of creating incentives and cooperative support from the populace, while forcefully providing a stable and safe public environment. Victory is achieved when the populace consents to the government's legitimacy and stops actively and passively supporting the insurgency. To this end, security is a cornerstone for successful COIN operations and a principle target for the insurgent. The insurgent enemy will use terrorism, media, and propaganda to foster insecurity with the populace, to promote a lack of confidence in the governmental control, and to cause the populace to question our ability to be an effective and stabilizing combat force.

Insurgents hide nearby to watch, after an attack on a U.S. vehicle.

In COIN, information warfare (IW) is a critical component to the success of either side. Unfortunately, perception and truth are not always synonymous. Insurgents often have an advantage in shaping the information environment and use it as a principal weapon to influence the populace and sway public support. The enemy can make exorbitant promises and point out government shortcomings, many of which are caused or aggravated by the insurgent. They use the open media to learn of our deployments, measure popular opinion, discern equipment capabilities or TTP, and broadcast attacks on U.S. forces to intimidate the populace and boisterously project the impression of invulnerability. On the other hand, U.S. forces seeking to preserve legitimacy must exercise restraint and discipline, remain fair and truthful, and ensure that words are successfully backed by deeds.

Never before have our Soldiers been under such immediate scrutiny of their individual actions, the effectiveness of their operations or equipment, and the outcome of their performance. This is the by-product of the information age, which is as much a component of modern warfare as any weapon on the battlefield. Embedded media; the Internet; the international press; home videos; and satellite, cell, and conventional telephones are common IW tools that can affect the strategic landscape as much as the most eloquent combat operation.

As a result, the demands on today's Soldiers are higher than they have ever been. They must be technically proficient in the most sophisticated military equipment in the world, manage volumes of information, be capable of integrated and joint operations, plus be innovative and adaptable to unique situations or emerging trends. Our Soldiers must be surgically aggressive, massing controlled fires against the enemy while protecting the innocent and minimizing collateral damage. They must be hardened against the violence of warfare, while maintaining compassion for helpless noncombatants. And they must be direct and decisive, while simultaneously remaining diplomatic in given situations.

Respond to the Threat

The dynamics of the contemporary battlefield have also dramatically challenged our Army and generated significant change in its response to the operational environment. Our military is being remolded to become more intelligence-centric; capable of rapid response, seamless integration, and unity of effort; in addition to being able to adjust organizational, conceptual, and tactical responses, while being more culturally aware.

Soldiers discover an arms cache during a search.

A prototype of an RG-31 with an arm investigates a suspicious object during testing.

Key to this effort are U.S. Army engineers. The Engineer Regiment is the most multifaceted branch within the U.S. Army and simultaneously supports the entire spectrum of military operations. While construction engineers support nation building by repairing infrastructures, providing public services, and improving living conditions, sappers provide safety, security, and protection by clearing routes of deadly IEDs, assuring mobility to combat forces, and clearing mines or explosive hazards in operational areas.

From the beginning of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), the United States Army Engineer School's CEHC has been at the forefront of this transformation and has led many of the solutions currently in place at the Army and Department of Defense level. Some of those original initiatives included—

- Blast-resistant route clearance equipment (RCE) such as the Buffalo, Husky, and RG-31.
- Mine detection dogs to support area clearance combat operations.
- Specialized search dogs to support explosive detection and counterterrorist operations.
- Prediction of the timing, use, technology, migration, and evolution of enemy IEDs.
- Development of an explosive hazards tracking system to provide analysis and a common operational picture.
- Counter explosive awareness training packages.
- Mission-specific individual and unit contingency training for route clearance and other operations.
- Early fielding of the AN-PSS/14 Mine Detector.
- Development of the tenets of IED defeat for the IED Task Force from assured mobility concepts.
- Gap analysis and improved doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) integration of solution sets.
- Integration of the combat training centers in counter explosive collective training.
- Specialized military search techniques, training, equipment, and doctrine.

Since then, CEHC has continued to respond to needs from the field while proactively developing innovative explosive hazards countermeasures. As the Army's integrator for all countermeasures involving explosive hazards, CEHC has defined its critical tasks as follows:

- Identify the threat
- Determine vulnerabilities
- Identify and develop solutions through concepts, technology, and training
- Integrate DOTMLPF solutions
- Disseminate countermeasures
- Evaluate effectiveness
- Institutionalize solution sets

Know the Enemy

To stay ahead of the IED and explosive hazards threat, CEHC consistently monitors trends in threat activity and their tactics and technology and tracks the migration and relationships among enemy factions. CEHC performs analysis not executed elsewhere in the Army and has been called on by the Multinational Corps–Iraq (MNC–I), JIEDDO, and TRADOC for specific operational analysis. Between 2005 and 2006, CEHC has analyzed more than 188,000 incidents and records as part of its explosive hazards database. CEHC also coauthored a joint paper on scientific countermeasures to enemy IED technologies and initiation systems.

The explosive hazards tracking system developed by CEHC, and originally used in OEF and OIF, has recently been adopted by Combined Forces Command–Korea as a more efficient tool to track and disseminate minefields or explosive information before and during potential combat operations. This change supersedes the tracking system and methods that were used for decades prior.

Equip the Force

CEHC remains in continuous contact with the field to identify equipment needs or gaps in order to immediately provide combat engineers with better mission capabilities. Having identified a need, CEHC coordinates with program managers, combat developers, government laboratories, the rapid equipping force (REF), JIEDDO, and others to evaluate suitable materiel systems and candidates for potential integration and rapid fielding. Once a device or item is selected, CEHC assists in integrating the system and developing its operational concept and training

Counter Explosive Hazards Center Contingency-Based Courses

Course Name	Course Description
Advanced Search Operations	(22 courses have been conducted, with 667 personnel trained, since October 2005) The course covers systematic search procedures to locate specific targets. The types of search operations that are taught are occupied/unoccupied building search, person search, vehicle search, route search, and area search. Additionally, in-depth training on the different components and uses of the Advanced Search Kit is conducted throughout the course. It is broken into two tracks: search advisers (sergeant first class through major); and search squad members (up to staff sergeant). Each course trains a total of 33 personnel and is conducted over a 3-week period at Fort Leonard Wood. CEHC is also working closely with the Joint Center of Excellence at Fort Irwin, California, in the development of complementary 1-week search awareness training for mission readiness exercises, plus refinement of the Advanced Search Kit.
Counterinsurgency (COIN) Fundamentals	(5 courses have been conducted, with 210 personnel trained, since August 2006) This is a new course that is taught as a stand-alone block of instruction to the Engineer Captains Career Course and others, or as a component of the IED Defeat Planning course. It is designed to provide junior leaders a better understanding of the COIN environment and how to integrate unit operations to affect strategic success.
IED Defeat Planning	(4 courses have been conducted, with 48 personnel trained, since December 2006) Although the new course has been added to the Engineer Captains Career Course, it can be provided as a stand-alone resident or mobile training team (MTT) course. The target audience is aimed at captains, majors, and senior noncommissioned officer (NCO) staff-level personnel and trains students how to plan and execute IED defeat operations at division level and below. The course is built around the understanding and employment of predictive analysis, search, and route clearance with and without RCE.
IED Defeat Train the Trainer (IEDD-T3) Course	(57 courses have been conducted, with 2,548 personnel trained, since January 2006) The course provides students with the individual/collective knowledge and skills required to provide training for their respective units on IED defeat TTP. It also informs Soldiers of current IED threats and countermeasures—such as Soldier awareness, IED search, patrol operations, convoy procedures, entry control points, vehicle-borne IEDs (VBIEDs), combat driving techniques, and electronic jamming—in a 2.5-day residential or MTT course.
Route Reconnaissance and Clearance Course (R2C2)	(23 courses have been conducted, with 1,031 personnel trained, since October 2005) This course teaches the systematic clearance of routes, using specialized mine-protected vehicles (MPVs). These vehicles are the Buffalo, Husky, and RG-31. Each course trains a total of 32 personnel, divided into four route clearance teams (RCTs) consisting of six operators and two leaders each. This is a 2-week residential course aimed at the individual operator and unit supervisors. A stand-alone Route Reconnaissance and Clearance Maintainers Course teaches the maintainer training for military occupational specialty (MOS) 63B (light-wheel vehicle mechanic) on each piece of RCE, as a 1-week residential course.
Area Clearance Course (ACC)	(13 courses have been conducted, with 230 personnel trained, since February 2005) The course begins with an introduction to area clearance principles, followed by area clearance operations methods using manual and mechanical clearance techniques and equipment. It is followed by student-led engineer training presentation and student-led clearance practical exercise. This 4-day residential course is primarily intended for U.S. units deploying to Afghanistan and includes the operation of the MV-4 flail system, plus familiarity with other clearance equipment and techniques.
Route Reconnaissance and Clearance Course-Sapper (R2C2-S)	(9 courses have been conducted, with 110 personnel trained, since April 2006) The course is primarily intended for BCT combat engineers and others who will not have the heavy, specialized RCE at their disposal. The aim of the course is to provide a basic knowledge of using robotic systems for stand-off detection, investigation, and neutralization to conduct route clearance operations without the use of specialized vehicles such as the Buffalo, Husky, and RG-31. This 2-week course has the same rank requirements as the R2C2 course.

support package. If necessary, CEHC will also accompany the system into theater during a final operational assessment.

CEHC coordinates very closely with explosive ordnance disposal (EOD) personnel and the United States Marine Corps engineer community to share IED solutions and equipment and brief JIEDDO to fund the evaluation and fielding of successful counter-IED systems. Basis of issue plans always include equipping forces in-theater, as well as the stateside training base for future rotations or mission readiness exercises. Through the efforts of CEHC, JIEDDO approved the following:

- Engineer robots equipped with a camera and gripper arm to investigate and visually confirm IEDs from a safe standoff distance during route clearance operations.
- Gyrocam® Systems security cameras to support engineers and EOD technicians by providing stabilized, on-the-move visual detection of suspected IEDs with high resolution color, thermal imaging, and night vision capabilities with a laser range finder.
- An operational assessment of prototype IED detection systems, to include Joint Systems Integration Board (JSIB) approval for all RCTs and brigade combat teams (BCTs), pending a successful in-theater evaluation.

Recently, CEHC has been evaluating a prototype IED Reconnaissance Vehicle, based on a Cougar 6x6 chassis, and has conducted both system integration and development of the operational concept to employ it in Iraq. The IED Recce package will provide enhanced IED detection features and is intended for use by engineers and EOD personnel. JIEDDO will send it into theater for an operational assessment in 2007, accompanied by members of the CEHC team.

In response to a requirement from OEF, combat engineers need a smaller IED interrogation vehicle, with a lightweight arm to perform route clearance operations in the restrictive Afghanistan terrain. As a result, CEHC has provided a Husky and an RG-31 to the Project Manager-Close Combat Systems (PM-CCS) at Fort Belvoir, Virginia, to develop an articulated arm designed to physically investigate suspicious objects, coupled with a magnetometer to identify metallic objects. Even though the requirement originated in OEF, systems will be sent to both Afghanistan and Iraq in 2007. Although a smaller version of the Buffalo arm, this system will allow better movement through restrictive terrain and poor infrastructure, while still providing mobility and stand-off investigation of explosive hazards.

Finally, CEHC will participate in a follow-up evaluation of tools and skills provided to the 3rd Brigade, 2d Infantry Division Stryker Brigade Combat Team (3/2 SBCT) engineers prior to their deployment last year. This assessment will help to determine the effectiveness of counter-IED training and specialized tools provided them so they could assure mobility for their parent brigade in the absence of heavy RCE. Several innovative tools were identified to augment the reconnaissance, explosives, communications, and weapons already embedded in this vital sapper unit. The Engineer School team also cross-walked the additional skills that unit leaders can obtain—either through existing courses (such as the Explosive Ordnance Clearance Agent [EOCA] Course, the Urban Mobility Breaching Course, and the Sapper Leader Course) or new training in areas like special infrastructure assessment—sewage, water, electricity, academics, and trash (SWEAT).

Train the Force

A key task for CEHC is training and updating the force in current counter explosive hazards techniques and employment of commercial off-the-shelf and contingency equipment. This instruction enables units to receive theater-specific training prior to deployment and allows them to focus on the mission during transition of authority. To ensure that the training is up to date and relevant, CEHC gathers the latest intelligence on explosive hazards TTP employed by the enemy, as well as TTP developed by deployed units, to counter that threat. Contingency training that will be permanently retained in the Engineer Regiment, such as operator training for RCE, will eventually be institutionalized and transferred to the official Engineer School curriculum.

CEHC has not only trained U.S. Soldiers, Marines, Airmen, and Sailors, but has also provided training and assistance to several allies and coalition partners. The table on page 19 lists the current contingency-based instruction offered through CEHC.

Conclusion

CEHC has been at the tip of the spear, identifying gaps and developing solutions against IEDs and other explosive hazards since the Global War on Terrorism began. Working together, CEHC, the Engineer School, and the United States Army Maneuver Support Center (MANSCEN) are part of a joint, interagency, and multinational counter-IED effort that integrates intelligence, training, technology, and materiel solutions into a holistic program. It will continue to seek out the best countermeasures for our units and produce the best training available for Soldiers at war today, while ensuring that our forces are prepared to counter the explosive hazards found in future conflicts around the world.

For more information, call commercial (573) 563-8165 or DSN 676-8165. Or visit our websites at <*http://www.wood.army.mil/cehc/*> and on SIPRNET at <*www.portal.inscom.army.smil.mil/cehc*>.

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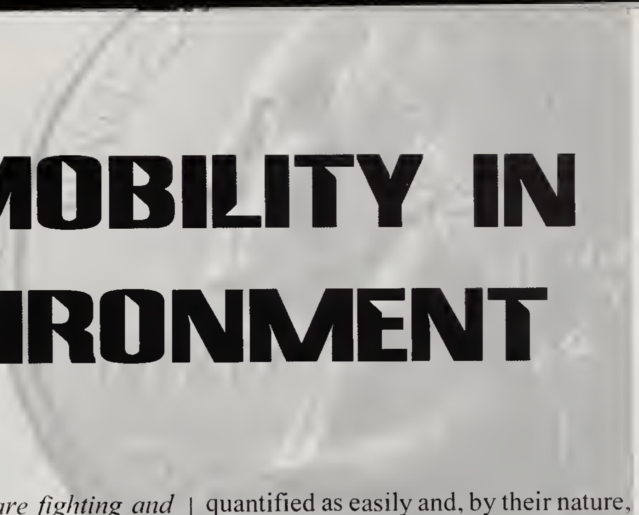

ASSURING MOBILITY IN A COIN ENVIRONMENT

By Major Iain J. Church

Although the concept of assured mobility was designed to ensure success on a linear battlefield against a conventional enemy, the fundamentals of assured mobility are equally important in defeating an unconventional enemy on an asymmetric battlefield (see Figure 1). Assured mobility can be described as a model that enables commanders to see first, understand first, act first, and finish decisively. While the fundamentals (predict, detect, prevent, avoid, neutralize, protect) remain the same regardless of the operation, they must be understood within the context of the environment faced—in the case of Iraq and Afghanistan, counterinsurgency (COIN) campaigns on an asymmetric battlefield.

Lieutenant General David H. Petraeus described the insurgencies in Iraq and Afghanistan as follows: "*The insurgencies in Iraq and Afghanistan were not, in truth, the wars for which we were best prepared in 2001; however, they are the wars we are fighting and clearly the kind of wars we must master.*"[1] In an effort to master these wars, the Engineer Regiment is developing capabilities that are not only affecting the current fight but also establishing a potent capability for future operations—mixing design and execution of courses to build new capabilities and educating commanders on how all capabilities, new and existing, can impact the asymmetric battlefield. The Engineer Regiment will play a key role in assuring mobility and successful execution of COIN operations. However, to fully understand the impact that harnessing new and existing capabilities can have, we need to first understand the environment they are to be used in.

The linear battlefield is a simple one—success can be quantified by measuring the enemy's remaining combat power in conjunction with the location of the front line. In contrast, COIN operations on the asymmetric battlefield can't be quantified as easily and, by their nature, are drawn-out affairs[2]. Unlike conventional war, they rarely produce instant results. Furthermore, when successful operations occur, success can be quickly overshadowed by the slightest amount of collateral damage that can be used by insurgents to turn a tactical setback into a strategic gain.

While serving as commander of the United States Southern Command, General John R. Galvin succinctly captured the problem facing military powers engaged in COIN operations when he stated, "*The…burden on the military institution is large. Not only must it subdue an armed adversary while attempting to provide security to the civilian population, it must also avoid furthering the insurgents' cause. If, for example, the military's actions in killing 50 guerillas cause 200 previously uncommitted citizens to join the insurgent cause, the use of force will have been counterproductive.*"[3]

The Fundamentals of Assured Mobility

Predict actions and circumstances that could affect maneuverability.

Detect early indicators of impediments to battlefield mobility.

Prevent potential impediments to maneuverability from affecting battlefield mobility of the force. A key is to develop predict-to-prevent linkages to detect impediments and identify alternative mobility corridors needed to…

Avoid battlefield impediments.

Neutralize, reduce, or overcome impediments (from traditional mines to industrial chemicals) that cannot be prevented or avoided.

Protect against the effects of enemy impediments. Successful application of assured mobility analysis is gained through a sequential and continuous application of the fundamentals throughout the imperatives en route.

Figure 1

Ultimately, success in COIN operations is gained by protecting the populace rather than the COIN force and by maintaining legitimacy. The effect of protecting the populace is twofold: First, COIN forces establish and maintain legitimacy; and second, the insurgents' most valuable resource—the support of the populace—will be eroded. The protection of the populace and the ability of commanders to assure mobility are inextricably linked; you cannot achieve one without the other. Success cannot be achieved through the use of kinetic means alone; success will result from a combined use of kinetic and nonkinetic means. In a COIN environment, it is easier to separate an insurgency from

"One of the most overt tools in the current COIN fight is route clearance teams (RCTs), with a combination of Buffalo, RG-31, and Husky or Meerkat vehicles."

its resources than it is to kill every insurgent. Therefore, it is incumbent on the training base to develop capabilities and train the force in the full range of kinetic and nonkinetic skills to set the conditions for success.

The United States Army Engineer School's Counter Explosive Hazards Center (CEHC) at Fort Leonard Wood, Missouri, is developing three key capabilities that will provide commanders the tools to help protect the populace and assure mobility: search, route clearance, and counter explosive hazards planning. Teaching new skills is easy; however, as Sir Basil Liddell Hart stated in *Thoughts on War*, "*...the real challenge is not to put a new idea into the military mind but to put the old one out....*"[4] Educating the chain of command in the use of new skills is just as important as developing and teaching new skills. Search and route clearance courses concentrate on developing skills, and in order to educate the chain of command, the Counter Explosive Hazards–Planning (CEH-P) Course concentrates on how to employ all counter improvised explosive device (IED) assets in a COIN environment.

Search operations, possibly the commander's most potent nonkinetic weapon in COIN operations, can be offensive or defensive in nature. In addition, within an assured mobility context, search operations can impact across each of the fundamentals, but in both cases it is a significant force multiplier. Successful search operations are crucial to the success of COIN operations. It is better to find 100 detonators in a cache than to deal with 100 IEDs on the battlefield. Every layer of an insurgent network is susceptible to search operations, and secrecy and plausible deniability are crucial throughout an insurgent organization. Intelligence-generated search operations allow the counterinsurgent to gather the necessary evidence to negate both. Successful tactical operations have the potential for an operational and strategic impact—a successful search operation may produce the evidence required to convict key insurgent leaders in a court of law.

CEHC has started to develop a comprehensive search capability within the U.S. military, and it was limited to a 3-week advanced search course that covers six core skills: manual route search, person search, vehicle search, occupied- and unoccupied-building search, cache search, and area search. However, in an effort to increase the number of students and better meet the needs of the field, a 1-week all arms combat search course has been designed that focuses on personnel search, vehicle search, cache search, area search, and occupied-building search. Both courses emphasize the importance of intelligence, planning, flexibility on task, methodical searching, evidence handling, completion of documentation, and postoperation debriefs. The net result of these courses will be to build a graduated search capability that commanders can apply to operations depending on the complexity of the task and the value of the target.

One of the most overt tools in the current COIN fight is route clearance teams (RCTs), with a combination of Buffalo, RG-31, and Husky or Meerkat vehicles. RCTs provide a line of defense against IEDs, maintain lines of communication, and protect the populace and coalition forces. CEHC conducts a 2-week route reconnaissance and clearance course for Army and Marine Corps engineers on the use of all route clearance equipment (RCE). Training focuses on the application of fundamental route clearance principles and is aimed at operators and platoon-level leadership.

Due to the success of RCTs, it isn't surprising that they have become insurgent targets. A significant problem that exists for RCTs is the time it takes to deal with IED incidents. In order to enhance the capability of RCTs and reduce incident times, CEHC has developed a 2-week Route Reconnaissance and Clearance Course–Sapper (R2C2-S) to train the investigation and blowing in place (BiP) of IEDs using robotic platforms. Strict protocols have been developed outlining when and what R2C2-S trained personnel can BiP; their actions will be directed by individual theater policy.

Because developing new skills doesn't answer all of the field's needs, CEHC has designed the CEH-P course to ensure that new and existing skills are tasked and coordinated to have maximum impact on COIN operations. The course is aimed at brigade combat team, battalion, and company S-3 personnel who will be responsible for coordinating all counter-IED assets. It isn't designed to be a battle staff course per se. It concentrates on the importance of integrating assets and fundamentals of COIN operations and highlights the impact that current and new capabilities can have if fully integrated with one another, such as building linkages between RCTs; intelligence, surveillance, and reconnaissance (ISR) assets; and predictive analysis. As with all CEHC courses, emphasis is placed on knowledge and *how* to think—not *what* to think.

The development of new skills and the education of the force addresses two of the three areas critical to success: what needs to be trained and how capabilities should be employed. However, the mindset of commanders ultimately decides whether a COIN campaign is successful. It is critical that an offensive mindset is maintained; adopting a defensive posture to mitigate risk to COIN personnel is ultimately counterproductive. Field Manual (FM) 3-24 states, "*If military forces remain in their compounds, they lose touch with the*

Improvised Explosive Device Incidents		
Year	Number of IEDs	Remarks
2005	12,556	
2006	30,515	
2007 (through 14 February)	4,738	At the current rate, the total for 2007 will be 40,847

Figure 2

people, appear to be running scared, and cede the initiative to the insurgents."[5] Efforts to protect the force have had a significant effect on the effectiveness of IEDs; however, as General Peter Pace stated to the Senate Armed Services Committee: *"The increase in the number [of IEDS], despite the decrease in their effectiveness, has resulted in about a sustained level of casualties from IEDs…"*[6] Figure 2 outlines the significant increase in IED incidents over the last 2 years[7].

The insurgent is thus retaining enough freedom of maneuver to engage coalition forces at times and locations of his choosing; the goals of assured mobility and protecting the populace are not being achieved. While clearly it is important to protect the force against the effects of IEDs, more must be done to protect the force and the populace by preventing their emplacement in the first place. This can be achieved by applying the principles of assured mobility, protecting the populace, and developing a detailed understanding of the operating environment.

The Engineer School and CEHC are spearheading the effort to train the force to allow the U.S. military to master operations in a COIN environment. The skills being developed and trained allow the insurgent network to be engaged at a number of levels in such a way as to not alienate the populace. However, training new skills alone is not the answer. Success on the COIN battlefield will ultimately depend on assuring mobility and protecting the populace—and achieving both in a way to enhance the legitimacy of host nation governments.

For more information on all CEHC courses, see <*www.wood.army.mil/cehc*>.

Endnotes

[1] Lieutenant General David H. Petraeus, "Learning Counterinsurgency: Observations from Iraq," *Military Review*, January-February 2006.

[2] Both General Gregory A. Schumacher, Chief of Staff of the Army, and General James T. Conway, Commandant of the United States Marine Corps, have stated that the Iraq insurgency is likely to last 8 to 12 years.

[3] General John R. Galvin, "Uncomfortable Wars: Towards a New Paradigm," *Parameters*, 16, No 4 (Winter 1986): 6.

[4] Sir Basil Liddell Hart, *Thoughts on War*, Farber and Farber, 1944.

[5] FM 3-24/Marine Corps Warfighting Publication (MCWP) 3-33.5, *Counterinsurgency*, December 2006, para 1-149.

[6] Rowan Scarborough, "Enemy Doubles IED Use in Iraq," *Washington Times*, 7 February 2007, <*www.washingtontimes.com/national*>, accessed on 13 March 2007.

[7] Figures derived from the Combined Information Data Network Exchange (CIDNE), accessed on 14 February 2007.

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("IEDs," continued from page 15)

identification and often describe in great detail to EOD personnel what they see at the front of the route clearance patrol. So why can't engineers detonate IEDs? They can. While EOD-trained personnel are perhaps the best-qualified individuals for this task, they are not always available. Long wait times, increased risk, and mission requirements make it essential that engineers be allowed to detonate IEDs and complete their mission of breaching the obstacle and clearing the road for CLPs, other coalition forces, and local nationals.

Note: As of mid-March 2007, the theater command is reviewing the current policy to allow selected combat engineers to destroy common IEDs as part of a doctrinal engineer mission. One of those missions is being undertaken now by the RCTs. Task Force Troy and the Explosive Hazards Coordination Cell have been asked to draft a proposal for consideration that would authorize engineers trained in the EOCA Course and the Counter Explosive Hazards Center's Route Reconnaissance and Clearance Course–Sapper (R2C2-S) to destroy IEDs. If approved, it is likely that a new fragmentary order (FRAGO) will be published changing the current theater policy, defining the operational parameters, and authorizing these selected engineers to undertake this mission.

Brigadier General Silva is the Commander of the 411th Engineer Brigade (Theater Army) in support of Operation Iraqi Freedom. He is a graduate of the United States Military Academy, where he was commissioned into the Field Artillery Branch, and has more than 20 years of service in the United States Army Reserve as an engineer. In the civilian sector, he is Vice President, Finance and Business Development, for sPs Consulting, LLC, Lorton, Virginia.

Reserve and National Guard Work Together in Iraq

Photo by Staff Sergeant Chris A. Durney

By Staff Sergeant Chris A. Durney

Army National Guard engineers from the 875th Engineer Battalion, led by the United States Army Reserve 411th Engineer Brigade, are playing a critical role in ensuring military and civilian mobility in Iraq, as only engineers can. Their mission success is a testament to the strength of the Engineer Regiment, no matter the component.

Combat logistics patrols, military columns, and an endless stream of Iraqi civilian traffic move between metropolitan areas that are critical to rebuilding Iraq's infrastructure and economy. Responsibility for assuring mobility falls to the Reserve brigade, whose motto of "plan, build, and protect" describes perfectly their role in Operation Iraqi Freedom. To meet the "protect" part of the motto, the brigade turns to the National Guard battalion to help assure mobility by conducting route clearance missions.

During one of these missions on a major commerce and supply route, a route clearance patrol rumbles along at a snail's pace; sharp eyes peer out of reinforced windows and from inside a succession of heavily armored vehicles. They are looking for signs of buried improvised explosive devices (IEDs). These Soldiers are familiar with this

(Continued on page 36)

Photo by Staff Sergeant Chris A. Durney

A Soldier peers out of the reinforced window of a Buffalo during a route clearance patrol.

Diamondbacks Reduce a High-Threat Area

By Second Lieutenant Charles W. Scheibe

Thousands of Soldiers travel the roads in Iraq daily, and any one of them can tell you that certain areas are constant hotbeds for insurgent activity. Engineers from 2d Platoon, Headquarters and Support Company ("Diamondbacks"), 92d Engineer Battalion (Combat) (Heavy), recently helped to eliminate one of these areas.

Along a supply route in central Iraq, heavy equipment operators from 2d Platoon leveled a berm—a raised earthen barrier that separates two areas—that was routinely used by insurgents to hide from patrols and convoys, just waiting to initiate improvised explosive devices (IEDs) and fire at convoys with rifles and rocket-propelled grenades (RPGs). The heavy-equipment operators from 2d Platoon worked over 28 hours to level more than 40,000 cubic meters of dirt. During that time, they rotated shifts and kept the bulldozers running for 18 hours straight. While 2d Platoon leveled the huge berm, 3d Battalion, 8th Cavalry Regiment, provided security. This was a massive effort by maneuver units and engineers.

After the area was leveled and the threat reduced, Echo Company put up soccer goals on the now-safe site for local children. Units and convoys that have traveled the route since completion of the project have reported seeing children playing on the new soccer field.

Photo by First Lieutenant James Yount

A D7 bulldozer grubs the project site.

Photo by Captain Steven Johnson

The berm was removed, decreasing enemy activity and making way for a new playing field.

Enemy activity at this location has decreased significantly since the berm is no longer there for insurgents to hide behind. Convoys and patrols are safer and can now maneuver through the area with greater ease. But even though the primary goal of this mission was to change the area so the enemy could no longer use it as key terrain, just as importantly, 2d Platoon provided a positive influence for a few more Iraqis of the next generation.

Second Lieutenant Scheibe is the Equipment Platoon Leader, Headquarters and Support Company, 92d Engineer Battalion (Combat) (Heavy). He holds a bachelor's in history and political studies from Chaminade University, Honolulu, Hawaii.

Note: The 92d Engineer Battalion is deployed to Iraq under the 411th Engineer Brigade, New Windsor, New York. The 92d was deployed for the start of Operation Iraqi Freedom, Operation Iraqi Freedom 04–06, and now Operation Iraqi Freedom 06–08—continuing its same mission of keeping supply routes safe for coalition forces.

EXPANDING FORWARD OPERATING BASES IN AFGHANISTAN

By Captain Nicholas O. Melin

The Soldiers of Task Force Pacemaker completed numerous road construction missions during their deployment to Afghanistan. However, their nation-building efforts and major infrastructure improvements could not be conducted until they first constructed safe havens to operate from. Three forward operating bases (FOBs) were constructed and two existing FOBs were expanded across southeastern Afghanistan. The expansion of the Sharana Provincial Reconstruction Team (PRT) base is a good example of military construction in Afghanistan. An analysis of this project provides valuable lessons learned that can be applied to the construction of future base camps in austere areas.

The Sharana PRT base is located outside of the city of Sharana. On open terrain with good drainage and no local national property rights issues, it was ideal for expansion from a small base to a larger logistical and operational hub. Sharana, the capital and second largest city in Paktika Province, had a network of roads that required improvement to support the new democratic local government.

The expansion of the Sharana PRT base allowed the construction of improved gravel roads in an area long deprived of a reliable transportation network. Linking the capitals of Paktika and Paktia Provinces to the main paved ring road system—the major trade roads that form a loop by connecting major cities—allowed the central government of Afghanistan to move more freely in areas that were isolated from government influence. Medical assistance, international aid, and security from the Afghan National Army and the Afghan National Police were all benefits to the Afghan people resulting from the FOB and road construction.

The Plan

During the summer of 2005, Task Force Sword (the engineer brigade headquartered in Afghanistan) chose the Sharana PRT base as the future hub of engineer operations in Paktika Province. It was to house elements of Task Force Sword as they completed road construction projects in the area. Task Force Pacemaker would then take over the expansion, while continuing the construction of a network of two-lane gravel roads around the town. All Task Force Pacemaker elements would then move to the Sharana PRT base in December 2005 to support the turnover of Regional Command South to the International Security Assistance Forces (ISAF). The final phase of the expansion would ensure that all facilities were complete, allowing incoming units to use the Sharana PRT base as a hub of operations for continued road construction efforts in the area.

Getting Started

The first phase of construction began in early September 2005. Force protection walls and guard towers were built, and two Soldier living areas were initiated. By the end of October, significant progress was made on phase one objectives, with construction of Soldier barracks and a command post completed.

Task Force Pacemaker assumed the mission in October 2005. Upon arrival, a survey of construction operations was conducted to decide which areas required action next. Due to mission requirements, road construction projects in the area required that the Sharana PRT base be expanded within a two- to three-month period. The need to provide immediate living space had led to rapid construction of living facilities, so the ground had not been leveled, compacted, or graveled, and many buildings were constructed on a slope. Additionally, some facilities needed to be winterized. Drainage in some areas was insufficient for wet Afghan winters, and a comprehensive electrical design and layout was necessary for efficient use of generators.

The two most pressing issues were materials management and funding. The surge of large amounts of construction materials into the small base made materials management difficult. Also, there was an increase in troop requirements in the middle of the project that made initial estimates no longer valid.

- Although a system was already in place to track materials on the FOB, they were not consolidated and allocated to projects by priority. This led to confusion with multiple units conducting construction operations.
- An audit of project funding also revealed shortfalls. Funding was provided in three separate segments, corresponding with the construction phases. However, cost estimates for the project were determined without completing a design and full material estimate. Thus, the actual cost of materials was far higher than forecasted.

In order to address these issues and complete the expansion on time, Task Force Pacemaker assembled a construction team of military engineers, local Afghan contractors, and civilian contractors from KBR (formerly Kellogg, Brown and Root).

Completing the Mission

The first step was to create a comprehensive timeline of all construction tasks. Priorities were established for the remaining tasks, with the focus on completing the force protection plan; providing proper living areas and sanitation; and expanding morale, welfare, and recreation facilities. Combined Joint Task Force 76 dictated that facilities be jointly used by all tenant units, so most facilities on the FOB required expansion.

The designs were reviewed, and additional tasks were added to meet the construction intent. An example is the construction of a pump house—a required winterization task—for the expansion well. Additionally, there was a need for a clarification and water storage system on the base. These three needs were combined into a single facility, which was not initially identified as a task.

A contracting officer was assigned to manage all contracts, and the progress of those facilities was integrated into the construction plan. The local construction community provided valuable manpower for large tasks, and local construction methods were suitable for use on the FOBs in many areas. Designs and material estimates were completed for all facilities to correct funding issues. The tasks were then redistributed through the three funding blocks to ensure that all stayed within cost limitations.

During construction operations, it became apparent that consolidating and tracking construction materials was necessary. With more than 80 individual projects at various stages of completion, there were huge amounts of construction materials. No shortage lists existed to track what was available for construction and what should be ordered. A complete inventory of the shipping containers—to include location, contents, and serial numbers—was conducted, and a database of all construction materials on the Sharana PRT base was

U.S. Army photo by 1LT Claudia Crossland, Task Force Pacemaker

A small emplacement excavator (SEE) operator digs through the rocky terrain so sewage pipes can be laid.

U.S. Army photo by 1LT Claudia Crossland, Task Force Pacemaker

Soldiers transport hand-mixed concrete with wheelbarrows during the placement of a maintenance pad.

established. Finally, all construction materials were consolidated into a single area, and the S-4 tracked and controlled their release.

Surveyors conducted a topographic survey of the base to show areas where drainage issues would appear once winter rains began. Additionally, they mapped electrical and communications lines on the base and established a master drawing of the expansion. To prevent severing lines during construction operations, a dig permit system was established.

The surveyors determined a layout for the sewer and water distribution systems, including the repair and integration of the existing water and sewer systems inside the compound. Unfortunately, the ground beneath the expansion site was solid rock a foot below the surface. An excavation plan to dig to a depth of 4 feet (below the frost line) for all sewer and water lines was required. The result was one water system with two operational and insulated wells and all sewage generated on the base flowing to a two-basin oxidation pond.

Obstacles

The constructing commander faced a number of obstacles that complicated construction. The first was employment of local national workers. Many of the workers were unskilled and could only do the most basic tasks, such as filling sandbags. As a result, the employment of large numbers of these workers actually slowed the work. Additionally, the commander had to ensure that proper force protection methods were used when interacting with local nationals. Despite these issues, integrating local workers provided extra muscle for tasks and generated good will in the community by providing jobs.

Another obstacle to efficient construction was the flow of materials. By December, the stockpiled materials on the Sharana PRT base were largely depleted. Local national haul of materials proved unreliable, and long haul distances from coalition logistical bases slowed the flow of materials. In order to continue construction, each Task Force Pacemaker platoon engaged multiple tasks. This allowed progress to continue with available materials while additional materials were transported. However, many tasks remained unfinished for months while awaiting key construction materials.

Tactics, Techniques, and Procedures

Construction at the Sharana PRT base highlights tactics, techniques, and procedures (TTP) to minimize the difficulties of construction in an austere theater of operations. They are as follows:

- Determine the purpose of the expansion. What is the standard of construction for the expansion? If building to facilitate a construction project, determine the need for facilities after your departure.
- Determine funding constraints and a timeline for receiving construction materials on-site. In Afghanistan, the funding process—from submitting the funding request paperwork to approval and receipt of materials—takes at least two months. The design, bill of materials (BOM), and all contracting requirements need to be determined two months in advance.
- Conduct a thorough reconnaissance and construction assessment. The following information is essential for expanding an FOB:
  - — Electrical layout and capacity.
  - — Water distribution system layout.
  - — Sewer system layout.
  - — Available square footage within existing perimeter.
  - — Available area outside of the existing walls.
  - — Portion to be cleared.
  - — Existing facilities on the base and their capability for co-use.
  - — Drainage analysis.
  - — Location for grey and, if necessary, black water disposal.
  - — Topographic survey results of the construction area for accurate initial design.
- Develop an initial plan for construction operations.
  - — Determine the population requirement (adding a 10 percent overage for surge).
  - — Calculate the number of required shower heads, toilet seats, and urinal soakage pits.
  - — Determine the layout for the water distribution system. Minimize the system size to save on required plumbing materials.
  - — Determine a force protection plan.
  - — Identify theater-level requirements before construction.
  - — Determine heating and cooling requirements.
  - — Determine dining facility requirements.
  - — Develop an initial FOB layout.
  - — Determine the required electrical layout.
  - — Integrate delays in receiving construction materials.
  - — Determine the required number and type of contractors required for the expansion. Their expertise is essential for heating, ventilation, and air-conditioning work; plumbing; and electricity.
- Order construction materials as soon as possible. Essential items are in high demand across the theater and may take two or more months to procure.
  - — Develop a detailed BOM.
  - — Prioritize construction materials by phase of the construction project, taking into account delays caused by local national contract transportation.
  - — Stockpile and secure materials at the location, if possible, or—at a minimum—transport materials for the initial construction with the unit by military convoy.
- Conduct troop-to-task for projects (assigning the proper number of Soldiers and types of equipment to successfully execute a task).
  - — Consider both vertical and horizontal tasks.
  - — Identify key equipment shortages that affect progress.
  - — Determine the number of local nationals to employ and the contracted equipment set required to fill shortages.
  - — Determine tasks that must be contracted as soon as possible.
  - — Initiate the process of finding contractors and securing funding.

- Monitor all local national contractors, and expect delays with any task completed using contract rather than military labor. Local holidays will halt all local national labor.

Potential projects for engineer units in areas of operation like Afghanistan are varied. There are situations where time is not available for detailed planning, and units must attempt to execute the mission as completely as possible, given the available resources. Application of some or all of these TTP should help to avoid potential construction issues and ensure the timely completion of construction.

The Results

When completed, the capability of the Sharana PRT base was greatly expanded. The maximum supportable population increased more than seven times its original size. The base now has showers, an operational laundry facility, and latrines with flushing toilets. The water system has operational pump houses that provide redundancy for the entire facility. The motor pool has office buildings and maintenance facilities that provide heated, all-weather maintenance areas for a battalion task force and a direct-support shop.

The Task Force Pacemaker expansion of FOBs supported the construction of road networks throughout Afghansitan. The long-term result was that the capitals in Zabul, Paktika, and Paktia Provinces were linked to the paved ring road around Afghanistan. This new freedom of movement allowed the central government of Afghanistan to move easier in areas that were once isolated from government influence. Medical assistance, international aid, and security from the Afghan National Army and the Afghan National Police were all benefits to the Afghan people resulting from the road construction.

The roads also facilitated the growth of the Afghan economy by providing reliable, all-weather routes for goods and services to move between provinces. The increase in traffic along the routes and the appearance of gas stations and markets in areas that were deserted before road work was completed is evidence that the road campaign conducted by United States Army engineers in Afghanistan made a difference.

Captain Melin, the Commander of Bravo Company, 864th Engineer Battalion (Combat) (Heavy), conducts road construction and forward operating base improvement. He previously managed the Task Force Pacemaker construction projects as the Assistant S-3 for the 864th Engineer Battalion at Fort Lewis, Washington. He is a graduate of the United States Military Academy.

• • • • • • The Engineer Writer's Guide • • • • • •

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Detecting Underground Penetration Attempts at Secure Facilities

By Lieutenant Colonel Robert E. Tucker Ph.D., Dr. Jason R. McKenna, Dr. Mihan H. McKenna, and Dr. Michael S. Mattice

The protection of secure facilities such as forward operating bases (FOBs) and theater internment facilities (TIFs) is an emerging issue in light of the successful and nearly successful underground breaches at overseas bases, along our borders, and at prisons in foreign countries where suspected terrorists are held. The armed forces are now investigating sensor modalities to protect secure facilities, because covert tunnels can conceal and protect terrorist activities, weapons of mass destruction, command and control facilities, and other functions. The technological sophistication observed in some of the tunnels (such as uses of power conduits; heating, ventilation, and air-conditioning [HVAC] systems; reinforced concrete; and other metallic objects) shows a high degree of engineering skill and financial backing. But seismic and acoustic technology that is currently available can be used to span the underground protection gap within our force protection strategy.

During studies conducted at a base camp in Iraq from July-November 2005, the most promising technology used an array of acoustic and seismic sensors placed at various depths to determine the characteristic signatures produced by underground tunneling, as well as signatures produced by personnel and equipment typically located within a base camp (such as generators, vehicles, and heavy equipment). Subsequent analysis determined that local geologic characteristics were of primary importance in governing both surface and subsurface signals of interest.

Site Geology and Test Facility

The general geologic setting of the base camp consists of various layers of fine-grained sediments from surficial windblown silts and sands to compacted silt and clay-bearing layers with varying amounts of gypsum and unconsolidated coarse to fine sands at a depth of 7 meters. All sediments are damp below about 1 meter.

The windblown material is typically well-rounded quartz grains that are 1 millimeter or less in diameter. This mixture of small mineral grains becomes cemented at a depth of about 30 centimeters, apparently due to precipitating gypsum minerals. This top layer gives way to between three or four distinct layers of buff or tan layers that are intermixed with gray-green layers of compacted silts and clay minerals (Figure 1). These layers vary in depth and vertical extent, depending on the location within the camp. Gypsum is present in the upper layers.

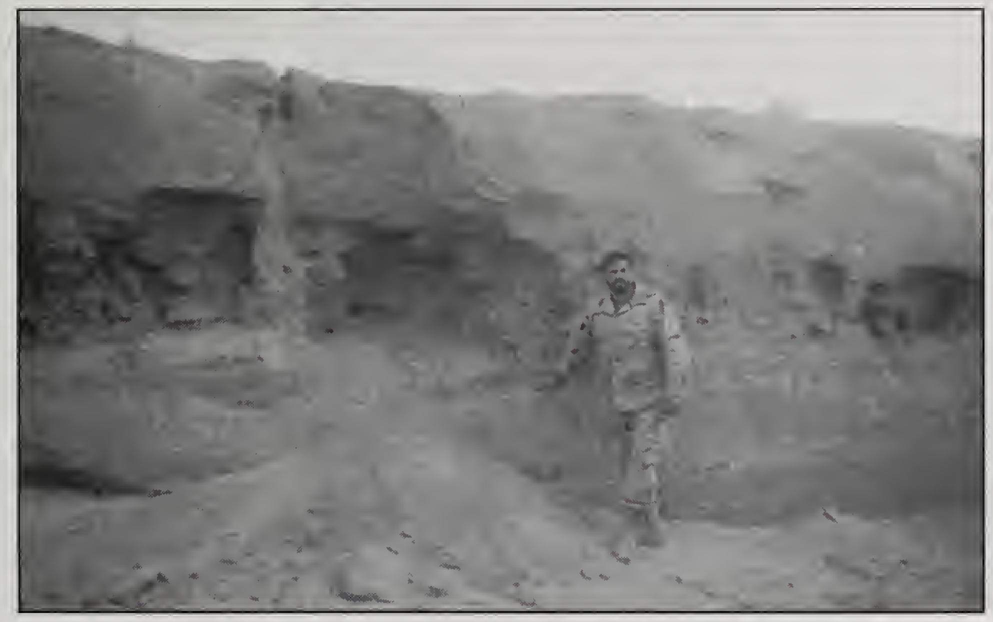

Figure 1. A typical strata sequence in the study area. Note the subtle color changes and weathering differences.

Within the base camp, the natural topography has been disturbed by extensive leveling and building. However, throughout most of the area, an unconsolidated layer of sand is encountered at a depth of about 6.5 to 7 meters. The sand layer has visibly distinct bedding planes occurring at all angles. The overlying silt slumps into the sand layer so there is not a distinct boundary between the two layers.

To validate sensor performance, an 8-meter vertical shaft with an interior side dimension of 1.2 meters (4 feet) was designed and constructed. Camp personnel excavated a pit with a vertical wall (Figure 2) where the shaft was placed so the tunnel would be right at the silt-sand contact (about 7 meters deep at this spot). This allowed about 1 meter of the shaft to stick up aboveground. A pulley system attached to a head frame allowed the spoil to be removed at about 0.25 cubic feet per bucket (about one-third of a 5-gallon bucket).

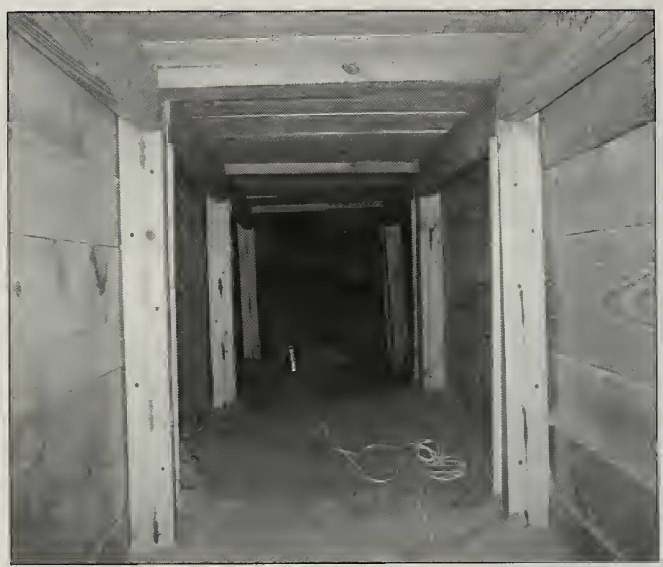

Figure 3. A look down the tunnel to the working face.

The tunnel leaving the shaft was about 1.2 meters in height and width, and the shoring consisted of vertical posts with 2 by 6 lumber on the top and sides (Figure 3). The tunnel began in the sand layer, and almost immediately, the silt layer slumped into the course of the tunnel from the right, leaving only about one-third of the working face as unconsolidated sand. Thus, the back and sides of the tunnel were constructed in hard silt, which made the tunnel extremely safe. However, it took about 3 days to dig the tunnel to the desired length (6 meters) before testing was initiated. The data collection was initiated at this length in an attempt to minimize any backscatter problems from the digging operations and unwanted clutter noise coming down the shaft and into the tunnel. Analysis of the data could not detect any such spurious acoustic or seismic contamination.

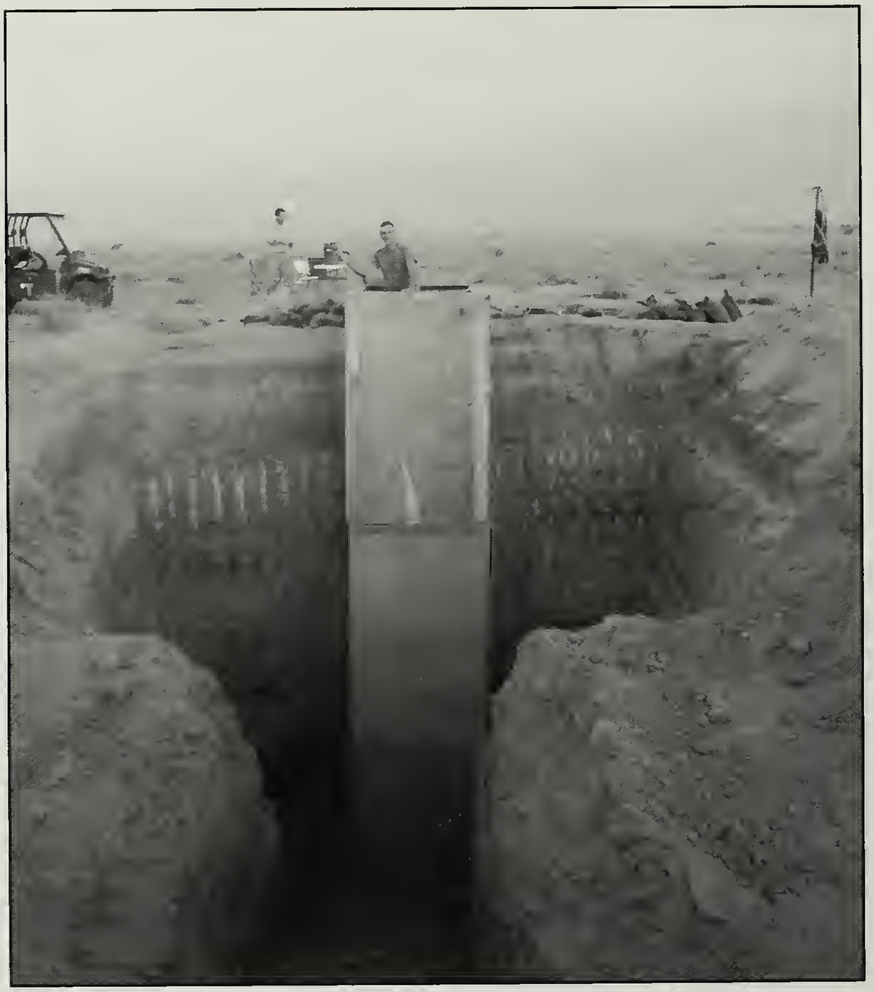

Figure 2. The shaft in place. Note the various layers of compacted silt.

Geophysical Data

The data collection sensors were placed along the line of the tunnel and perpendicular to it. The sensors were also placed at varying depths to determine the attenuation capabilities of the layers for sounds generated at the surface and in the tunnel (such as from trucks, generators, walking, and digging). A variety of data was collected during underground digging operations, which was completed with tools similar to those used by detainees to construct tunnels. After a series of signal-processing algorithm are implemented, it is possible to automatically differentiate signals underground at the 90 percent confidence interval or better (Figure 4).

It is important to note that the near-surface environment is dynamic: changes in the soil conditions in the upper few meters of soil can influence sensor performance dramatically. For example, after the initial series of data was collected, a 36-hour rain occurred. After the rain stopped, a second series of tests was conducted, using the same collection parameters. The particular signature of a source signal did not change, but the amplitudes increased significantly. The increase in the amplitude of the measured data varied from 10-15 decibels (dB) up to 450 hertz (Hz) (Figure 5). This is interpreted to be the infilling of interstitial voids by water, providing a better medium for wave propagation than grain-to-air and grain-to-grain interface. These types of evolving sensor-soil interactions illustrate the need for multisensor protection models and also illustrate why simple threshold detection methods invariably have high false-alarm rates.

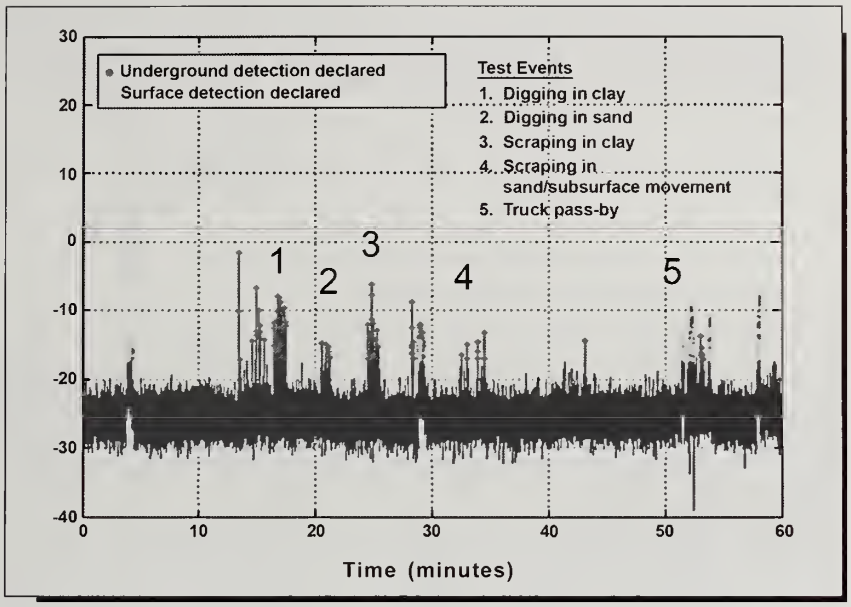

Figure courtesy of BBN Technologies

Figure 4. Results of signal processing to automatically classify signals originating from the surface and underground.

Force Protection Models

Analysis of the test data indicate that passive seismic and acoustic collection arrays will detect and classify active digging operations near a protected facility after advanced signal processing is performed. Emplacement of a seismic/acoustic array will cause a minimal surface footprint or impact to the facility operations. Five concerns need to be addressed to take full advantage of this technology:

- Designing and integrating the seismic/acoustic array into the overall security plans of the facility.
- Constructing the array in conjunction with the facility to minimize costs and maximize effectiveness.

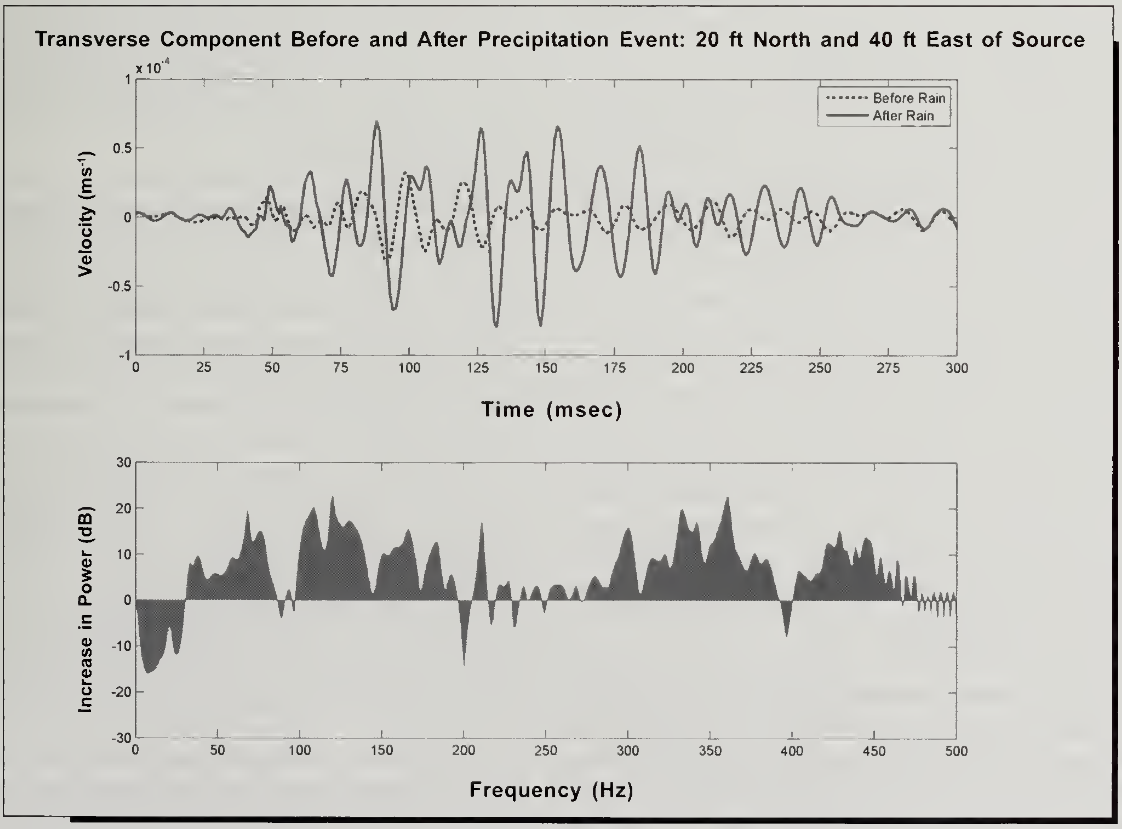

Figure courtesy of Dr. Jason R. McKenna

Figure 5. Example of the increase in seismic amplitude after a steady 36-hour rain (same source and location).

- Collecting enough data to categorize the cultural signatures within and near the facility in order to integrate these signatures into the detection algorithm.
- Training the facility managers on the system and how to recognize anomalies (for example, if actual tunneling occurs).
- Maintaining reachback to the system administrator to provide expert interpretation, troubleshooting advice, and additional upgrades as situations change.

The working system that is envisioned contains the sensor array along the perimeter, continuously collecting data that is fed into a central data processing or monitoring site at the facility. This is where incoming signals are compared to test modules. Any detection of targeted frequencies or modules alerts the on-site system managers. At this point, the data stream with the module or frequencies of interest can be sent to a reachback service for confirmation and/or further analysis. The key to a successful interception operation is continued surveillance of incoming underground data and triangulation of the source in reference to depth and direction. Most of the tunnels take time to construct, particularly if they are constructed by hand. Commanders then make decisions on the best method to intercept the perimeter intrusion.

It is important to realize that during this study, the TIF operations focused on detecting outgoing tunnels. However, there is a significant need to detect incoming tunnels that could bring explosives or weapons into a secure facility. A tunnel used to breach the security perimeter of an outpost along the Israeli border contributed to the military operations that were conducted this past summer in Lebanon between the Israeli Defense Forces and Hezbollah.

Another important aspect of the system data analysis is to ensure that the false positive rate is kept to a negligible rate. One solution is to provide the facility with its own tunnel, where periodic testing of the sensor array would originate. This negative Z detection capability provides commanders confidence in their force protection technologies.

To illustrate the usefulness of such a force protection model globally, consider the Otay Mesa tunnel discovered on 26 January 2006. The tunnel, one of four located within a two-week period between Tijuana, Mexico, and San Diego, California, is the longest (approximately 731 meters, or 2,400 feet) and most sophisticated tunnel ever found under the southern border of the United States. Beginning in a warehouse near the Tijuana Airport in Mexico, it follows a northeasterly route to a warehouse in Otay Mesa, California. The entrance on the U.S. side was concealed by the tile floor of an office in the warehouse.

Soil sampled in the tunnel was very moist and sandy and contained large (at least 4-centimeter) clasts of volcanic tuff. Layers of clay were interbedded with the sandy material, and white concretions were visible throughout. In the Otay Mesa area, the geology is very similar to that encountered overseas. The seismic-acoustic signals from digging appear very similar to those detected overseas, but here, the ambient noise is much more intense. However, despite the presence of numerous trucks idling near the sensors, the signals of interest are clearly visible.

Conclusions

Protecting underground perimeters is the next capability gap to be bridged in the force protection arena. The potential underground penetration of secure facilities needs to be addressed in our current force protection models and capabilities. A system for protection of these facilities must be planned during the earliest phase of facility construction and integrated into the construction scheme. The system must be able to monitor or detect attempts at underground penetration; use current technologies for immediate operational employment and upgrades; and be easily monitored by personnel at the site, with constant technical reachback ability. The use of seismic and acoustic sensors provides the facility commander with an excellent passive data collection capability that can readily distinguish tunneling activities from the surface-originating sounds encountered on a base.

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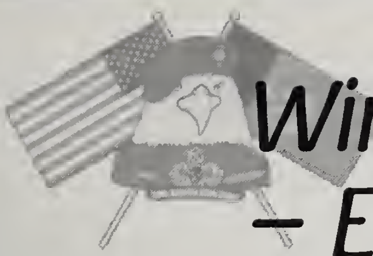
Dr. Michael S. Mattice was the project lead, working with the United States Army Rapid Equipping Force, Fort Belvoir, Virginia.



Winning Hearts and Minds – Eagle Style

By Captain Becky L. Lapidow

The concept of "winning the hearts and minds" is heard so often in the media when discussing the Global War on Terrorism that it has almost become meaningless. Winning hearts and minds can be especially tough in a country such as Afghanistan, where decades of armed conflict have made the rural population leery of armed personnel bearing gifts. Despite this challenge, elements from the Afghan National Army (ANA); Headquarters Company, Task Force Eagle; and Charlie Company, Task Force Eagle, conducted a combined medical assistance and humanitarian assistance mission. By giving supplies such as shoes, food, and clothing and providing medical attention, Afghan and American Soldiers demonstrated the meaning of winning the hearts and minds to the local population and demonstrated the benefits of supporting the Afghanistan government's efforts to bring security and stability to this area of the Paktika Province.

Photo by Captain Becky Lapidow

A Task Force Eagle Soldier helps local children carry supplies received from the humanitarian assistance mission.

While medical screenings were conducted and humanitarian assistance packages were provided, ANA and Charlie Company Soldiers provided inner and outer rings of security. The key to this mission was to ensure that the ANA was the lead so the townspeople could see the role their army played in improving their daily lives. Before setup was finished, the townspeople started filtering inside for medical screenings. Symptoms such as burns, pink eye, diarrhea, and skin infections were treated by ANA doctors and Task Force Eagle medics. Female medics and assistants stood by to support the medical requirements of adult women and young girls, while male medics treated adult males in a separate room. More than 50 children came for medical treatment, and with the assistance of two ANA medics, no time was wasted—everyone was treated. The medics worked nonstop and had plenty of supplies on hand to treat everyone who came for aid. As with the ANA security lead, it was critical to have the ANA doctors and medics present to treat patients. Besides showing their lead in the event, it allowed Task Force Eagle medics an opportunity to train their Afghan counterparts. An ANA doctor remarked that a Medical Civil Affairs Program (MEDCAP) is good for the ANA and townspeople alike. It shows a close relationship between the ANA and the locals and that the American Soldiers are here to help. Referral slips with the name of the doctor and location of the new government clinic were provided to patients to demonstrate the Islamic Republic of Afghanistan's commitment to improving their lives.

Another way Afghan and American Soldiers helped win over the townspeople was to hand out everyday supplies to the children and the adults. An ANA and Task Force Eagle team provided aid to more than 150 people in desperate need of such supplies. Similar to the combined medical assistance part of the mission, the focus was to ensure that the Afghan soldiers were seen handing out the items alongside the American Soldiers. Most of the items—such as clothes, backpacks, shoes, pens, pencils, and coats—were geared toward the children. Many of them walked away with bundles of items bigger than they were. While the U.S. Army provided most of the supplies, some of the materials were donated by Soldiers' family members. Adults were provided staples such as rice, beans, flour, and blankets for the cold winter ahead. The town elders were pleased with the humanitarian assistance, because they realize that some of their townspeople have very little as the winter approaches. The mission brought assistance to people in need, and the hope is that Afghan nationals and the government of

Photo by First Lieutenant Keith Mueling

A Soldier helps fill a backpack for some local children.

Afghanistan will be able to help themselves for the long term. This is also why it is so important to have the ANA involved in these operations—to develop their ability to execute the missions and provide future assistance on their own.

In addition to winning the hearts and minds of the Afghan nationals, this assistance mission helped build a relationship with them so they'd be more welcoming to Task Force Eagle engineers conducting road construction near their town. This demonstrates an important balance between building needed roads and reaching out to the public, showing the benefits of such infrastructure. This mission was also an opportunity for the Afghan and American Soldiers to work together, proving that coalition success requires working for the common goal of rebuilding the nation of Afghanistan. Just as important, the Task Force Eagle Soldiers walked away feeling that they made a difference in the country of Afghanistan—illustrating that the term "winning the hearts and minds" is more than a meaningless catch phrase.

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Fort Hood Training Capabilities Website

The Fort Hood Training Capabilities Website at <*https://mdtt.hood.army.mil/capability/main.html*> is a single online entry point for III Corps and Fort Hood's Live Virtual and Constructive (LVC) and Joint, Interagency, and Multinational (JIM) training capabilities. The site provides users with training resource descriptions, scheduling instructions, and resources information links to help match training requirements with Fort Hood's vast array of training resources. Fort Hood is one of the premier Army locations providing Soldiers with a wide variety of realistic maneuver areas and live-fire training ranges designed to support training at both the individual and collective levels. Visit the Fort Hood Training Capabilities Website today, and learn about training resources available to enhance your training mission.

The point of contact is <*kristin.boyd@hood.army.mil*> or call (254) 287-0574 or DSN 737-0574.

("Reserve and National Guard," continued from page 24)

stretch of highway and the consequences that await anyone who is not vigilant.

On this particular night patrol, one of the trail gun-trucks spots a tiny stretch of cleverly concealed command wire and notifies the operator of the patrol's main route clearance workhorse—a Buffalo, a huge, truck-like armored vehicle—which pulls up to an area just off the pavement and goes to work. With a deft hand, an engineer Soldier inside manipulates the Buffalo's robotic arm and investigates the site. In a few minutes, he has uncovered and disarmed the buried munition, chalking up another success in disrupting insurgent activities. An explosive ordnance disposal (EOD) team harmlessly detonates the IED before the patrol continues on.

After more than eight hours outside the wire, the patrol pulls back into their motor pool. Dawn light is beginning to filter in over the camp as the Soldiers dismount and shed their body armor, helmets, and gear. They show a reserved satisfaction as they wrap up their duties and head for their quarters.

In the finest engineer tradition, the Reserve and the National Guard have formed a tight professional bond that has resulted in an impressive success record. As of 1 February, the National Guard unit conducted more than 800 route clearance patrols, covered more than 100,000 kilometers of roadway, and uncovered more than 300 threats to assured mobility. They know that each patrol is one step forward in the ongoing fight to bring stability and freedom to Iraq.

Staff Sergeant Durney is a member of the Arkansas Army National Guard's 119th Mobile Public Affairs Detachment and is currently on deployment with the 875th Engineer Battalion in support of Operation Iraqi Freedom. He began his career as a Navy journalist in 1976 and rejoined the military after a 25-year break in service. He is an award winning photographer and a private pilot. As a civilian, he is a public affairs specialist with the Arkansas National Guard Public Affairs Office and editor of the Arkansas Minuteman quarterly magazine.

Joint Engineer Operations Course

By Mr. Robert B. McFarland, Jr.

The joint engineer community continues to move forward in the process of educating and preparing its officers and noncommissioned officers for operations in the joint environment. The Doctrine Training Working Group (DTWG) of the Joint Operational Engineer Board (JOEB) overwatches the combined efforts of its engineer centers of excellence to fully develop the Joint Engineer Operations Course (JEOC), formerly known as the Joint Engineer Officer Course. The new course title provides a more accurate description of the intent and content of the course. The JEOC is a two-phase course designed to better prepare officers and selected senior noncommissioned officers for duty on the joint engineer staff of a joint task force (JTF). The distributed learning (dL) phase is designed to be 40 to 48 hours and a prerequisite for attendance of the resident phase, designed to be 32 to 40 hours.

Prompted by its own introspection (see *Engineer*, January-March 2006, "Joint Engineer Officer Course," page 17) and guidance derived from the *National Military Strategy, Quadrennial Defense Review*, and the Chairman of the Joint Chiefs of Staff's *CJCS Vision for Joint Officer Development*, as well as from other sources, the joint engineer community has firmly set its sights on developing engineers who are better prepared and who can quickly immerse themselves into the JTF and its ongoing campaign.

To date, there have been two JEOC pilots. The popularity of the course has resulted in a continuing dialogue among the joint engineer community on the course itself, as well as on joint operations and its impact on the education of the engineer force for the future. Enrollment queries occur regularly, in particular from junior leaders wanting to enhance their knowledge of joint engineer operations.

Course Concept

In October 2004, members of the JOEB-DTWG training subworking group met at Fort Leonard Wood, Missouri, to discuss JEOC development. Officers at the senior company grade and junior field grade levels were the target audience, but it was expanded to include senior noncommissioned officers and government civilians who could also serve in a JTF engineer billet. The concept of the course was defined as follows: *Understand and be able to integrate engineer capabilities across the spectrum of operations to ensure support of joint force commanders' engineer requirements and accomplishment of the joint mission.* The end state competencies that the student would possess upon completion of the course were to—

- Describe joint operations, joint warfare, and the joint planning system.
- Describe, comprehend, and apply joint engineer doctrine.
- Describe, comprehend, and apply joint engineer planning using scenarios, historical examples, and case studies.
- Describe and comprehend service engineer capabilities and unique requirements.
- Describe, comprehend, and apply the strengths, effects, and basic doctrinal employment concepts of service engineers.
- Describe, comprehend, and apply employment principles for using service engineer capabilities to support joint and service engineer requirements.

DTWG Determinations

The United States Army Engineer School's Directorate of Training and Leader Development (DOTLD) tasked its Training Integration Office to write the JEOC white paper that was distributed in March 2005 for comments from the field. Based on feedback, a formal JEOC presentation was given to the JOEB-DTWG on 7 April 2005. The presentation included a draft 160-hour course with an 80-hour dL phase and an 80-hour resident phase. The resident phase focused on the operational side of staff work and concentrated on a capstone engineer exercise centered on crisis action planning.

The DTWG determined that although the students needed to understand the operational environment where they worked, they needed to focus more on execution and less on planning. The resident phase length was relooked, with a target of 40 hours being the goal. All agreed that a resident phase was crucial to enhance the educational opportunity of the junior

"The JEOC is a two-phase course designed to better prepare officers and selected senior noncommissioned officers for duty on the joint engineer staff of a joint task force"

members of the joint engineer community. The ability to interact in a classroom environment, while focusing on issues and exercises specific to the joint engineer community, would provide an excellent opportunity to better understand each other's capabilities.

Training Developer's Conference

From 31 August to 1 September 2005, DOTLD hosted a training developer's conference (TDC) with 27 representatives from the Army, Navy, Marine Corps, Air Force, and other associated organizations. The attendees were formed into three working groups to address issues specific to their group:

- dL working group
- Resident phase working group
- Administrative working group

Each working group was assigned a senior advisor (a senior lieutenant colonel or a colonel), and these senior advisors were also the JEOC Executive Steering Committee.

On the second day, the Engineer School hosted a videoteleconference, with several of the combatant command engineers (United States Central Command, United States Southern Command, United States European Command, and United States Pacific Command) attending and incorporating their input into the course design. The end result of the TDC was a proposed two-phase 80-hour course with a 48-hour dL phase and a 32-hour resident phase. The decision was made that Fort Leonard Wood would host the first pilot course in June 2006.

Upon completion of the TDC, members of the working groups—consisting of key personnel from the Joint Forces Command, the Joint Staff J-4, the Air Force Institute of Technology, the Civil Engineer Corps Officer School, and the Marine Corps Headquarters—held monthly teleconference in-progress reviews (IPRs), providing lesson material and pursuing funding. The results of the TDC were consolidated, and the course concept was designed to meet the identified requirements. The proposed concept was presented to the JOEB at the next quarterly videoteleconference in November 2005. Coordination among the joint engineer community resulted in the United States Army Corps of Engineers® committing to provide funds for hiring two temporary employees to develop the JEOC program of instruction and associated lesson plans. The Joint Staff J-4 agreed to provide funds to develop the dL phase courseware.

In December 2005, the JEOC web portal was developed by the Directorate of Common Leader Training (DCLT) and a beta test was conducted to determine accessibility throughout the continental United States. A resident phase coordination IPR was held at Fort Leonard Wood in January 2006, where the TDC resident phase developer's intent was further clarified. This intent was then applied to the dL phase development to create the module linkage between the two phases. Further coordination with the Joint Forces Staff College, National Defense University, resulted in the *Purple Sunset* concept plan exercise becoming the primary source for driving the resident phase practical exercises.

A key result of the TDC was the determination of seat quotas. Upon returning from the conference, the Joint Staff J-4 engineer representative queried the combatant commands for their estimates of officers, senior noncommissioned officers, and selected civilians within their commands and component commands who would benefit from attending the JEOC. These personnel were divided into three bands, depending on their status and probability of participation with a JTF engineer staff.

- Band 1 personnel were those assigned to a JTF, combatant command, or component command.
- Band 2 personnel have a high probability of being tasked to help stand up a JTF.
- Band 3 personnel are junior officers preparing to join a prospective JTF headquarters and all others who would benefit from the JEOC.

The decision was made to use Band 1 numbers to determine seat quotas and keep with the original intent of having three small groups of 15 students for a total class size of 45. The total rollup for Band 1 was 174 personnel. This number provided the developers with a base figure to determine that an annual throughput of up to 174 personnel in 45-person groups would equate to conducting three to four classes per year. The personnel numbers were submitted by Service, and these figures were used to determine seat percentages. The Army received 21 seats (46 percent), the Air Force 16 seats (36 percent), the Navy 7 seats (16 percent), and the Marine Corps 1 seat (2 percent). The Army gave two of its seats to the Marine Corps to ensure that each small group had representation in it.

Course Development

In January 2006, a JEOC Tiger Team consisting of DOTLD and DCLT members was organized at Fort Leonard Wood to kick off the development of the dL phase. The team coordinated with the Joint Forces Staff College to use approximately 10 hours of existing Joint Knowledge Development Distribution Capability courseware in the first and second modules of the dL phase. A weekly IPR was established to coordinate the team effort. A *SharePoint* site was established to exchange materials and discussion among the team members, and DCLT assumed responsibility for developing the Learning Management System (LMS) portal for the JEOC dL phase. The decision was made to use *Blackboard* as the LMS to host the dL phase and to open it to the students in April.

Small-group facilitators for the resident phase were provided by each of the Services. The goal was to provide a facilitator (a senior major or a lieutenant colonel) who had served as a key member of a JTF engineer staff. Ideally, the facilitator would have served as a deputy JTF engineer or as a plans or operations chief. Each Service identified one facilitator, and they began to participate in the IPRs where they were assisted in navigating the dL phase lessons in *Blackboard* and shown some of the features that could assist them in corresponding with their students. Additionally, the facilitators arrived four days before the students and participated in a resident phase train-up session with the Fort Leonard Wood development team. The students were divided into three small groups. Each facilitator was assigned a group and began the collaborative process of assisting them as they progressed through the dL phase and prepared for the resident phase.

Pilot Course 1

There were 53 students enrolled in the first JEOC pilot course, conducted from April to June 2006, and 37 attended the resident phase. All four Services were represented. The student population also included four senior noncommissioned officers and two government civilians. The students were surveyed on each lesson during the dL phase and resident phase. A final course after-action review was held upon completion of the resident phase with the students, facilitators, and course developers. Recommendations from the students and facilitators were staffed and used to make updates and changes to the lessons. The students felt the course was important for their development, as well as that of their peers and subordinates, and many commented that they wished they had attended a course like this earlier in their careers.

Pilot Course 2

There were 83 students enrolled in the second JEOC pilot course, conducted from October to December 2006, and 48 students attended the resident phase. The dL phase was opened to the students in October, and the resident phase was conducted at Fort Leonard Wood in December. Facilitator selection and student notification were similar to the first pilot. However, for the second pilot, five facilitators participated. Additionally, the Joint Forces Command engineer representative attended and, in essence, provided a sixth facilitator. This tag team approach appeared to work well, and the facilitators recommended that it be used in future courses. As with the first pilot, student feedback was positive and enthusiastic.

The high level of interest within the joint engineer community resulted in the dL phase lessons from the second pilot being placed on the Fort Leonard Wood engineer portal—the JEOC Open Enrollment Course is open to anyone with an Army Knowledge Online (AKO) account. Students without an account are sponsored by others in the engineer community who have one, but the new Defense Knowledge Online (DKO) system is expected to help resolve this issue. This course currently has 38 students.

Pilot Course 3

JEOC development continues through fiscal year 2007. Through the cooperative efforts of the Joint Forces Command, Engineer School, Air Force Institute of Technology, Civil Engineer Corps Officer School, and Marine Corps Headquarters, the third JEOC pilot is scheduled for April to July 2007. The dL phase opens in April, and the resident phase will occur at Fort Leonard Wood in July. Both the facilitator and the student will be key players in ensuring the success of the course, not only for their Service but for the entire joint engineer community.

JEOC Graduates

Graduates of the JEOC pilot courses are followed for one year after their attendance—through surveys sent at 90, 180, and 365 days—to ensure that the course content continues to be relevant in their environment while serving in a JTF assignment. Although not all JEOC graduates are assigned to a JTF, many are assigned to combatant command staffs or serve with a service component staff in support of a joint force commander, and they also provide the JEOC development team with valuable feedback.

Mr. Robert McFarland is a contractor with C2 Technologies, Inc. and works in the Training Integration Office, Directorate of Training and Leader Development, United States Army Engineer School. A retired Army lieutenant colonel and a former battalion commander, he is a graduate of the Command and General Staff College and the School of Advanced Military Studies (SAMS). He is the project manager for developing the Joint Engineer Operations Course, along with other ongoing initiatives at the Engineer School.

Cooperative Graduate Degree Program at Fort Leonard Wood

By Dr. William J. Daughton

A cooperative degree program between the University of Missouri-Rolla and the United States Army Engineer School at Fort Leonard Wood leads to a graduate certificate in military construction management and to a master of science degree in engineering management, civil engineering, geological engineering, or public policy for officers in the Captain's Career Course.

In 1994, the University of Missouri-Rolla (UMR) and the United States Army Engineer School began a program of intensive study taught by UMR faculty at Fort Leonard Wood that allowed officers attending the Captain's Career Course to earn university graduate credit leading to a certificate in military construction management and then to a master's degree in engineering management. The program was established with a special tuition rate that makes it quite competitive and affordable. The first group of students completed this program in the spring semester of 1995, and since its inception, 881 officers have successfully completed their master's in engineering management through this program.

With the success of the program in engineering management, other degree programs were added in civil engineering, geological engineering, environmental engineering, and public policy. The program in public policy is supported by faculty from the Public Policy Administration Department at the University of Missouri-St. Louis (UMSL). Engineering management has been the most popular program by far, but all of the programs have been successful. The Fort Leonard Wood program is supported on-site by two UMR staff members to facilitate matriculation and completion of the program. All of the UMR programs are integrated into the Army's new web-based tuition assistance program *GoArmyEd* at *<http://GoArmyEd.com>*.

Program Structure

Military Construction Management Certificate

All officers entering the Captain's Career Course complete a core of four shared-credit courses that are a combination of instruction provided by Engineer School instructors and UMR faculty. Each course is worth 3 semester hours of graduate credit, resulting in the student accumulating 12 semester hours of graduate credit during the 20-week career course. The shared-credit courses are as follows:

- Engineering Management 313, Managerial Decision Making
- Engineering Management 314, Management for Engineers and Scientists
- Civil Engineering 345, Construction Methods
- Civil Engineering 442, Construction Administration, Planning, and Control

Upon completing these courses, students in engineering management, civil engineering, and environmental engineering receive a graduate certificate in military construction management. Public policy and geological engineering students earn 12 credits, but not a certificate.

Master's Degree

Completion of the graduate certificate in military construction management with a grade of B or higher in each course enables students to enter the master's program in engineering management without taking the Graduate Record Examination (GRE), provided they meet the normal requirements for their undergraduate degree field and cumulative grade point average. Students entering the master's program in the other fields are still required to take the GRE. Once admitted, students then complete the remaining six courses in one equivalent semester. The format of those remaining courses varies, depending on the program.

In engineering management, which is the most popular option, the courses are either taught in two 8-week compressed sessions at Fort Leonard Wood, or on the UMR campus in the normal 16-week semester. The determining factor is the alignment of the Captain's Career Course with the standard UMR semesters. There are four career course groups spread throughout each year, and typically two of them dovetail with the UMR semesters, and two do not. In the first case, students take the remaining courses on the UMR campus with the normal assembly of graduate students. In the latter case, engineering management instructors teach the remaining six courses exclusively to the officers at Fort Leonard Wood in two 8-week sessions. Civil engineering is only offered twice per year to those in career course classes that line up with the

UMR semesters; public policy courses are taught at Fort Leonard Wood only; and the geological engineering courses are taught on the UMR campus.

Program Feedback

The overall feedback from the participants is positive; they cite this cooperative program as an excellent way to earn a master's in an otherwise busy time. In particular, the UMR support staff on-site receive positive feedback for their helpfulness, easy availability, and positive attitude. The program also draws high praise from the participating faculty as well. Most faculty members view the officers as very motivated and engaged students, and they consider it a pleasure to teach them. The faculty members describe these students as among the very best graduate students they encounter. This creates a winning combination and contributes to a very productive and exciting learning environment.

The Future

Both UMR and the Engineer School consider this program to be very valuable. For UMR, the program represents an important extension activity in fulfilling its mission to provide outstanding engineering education in the state. The Engineer School values the opportunity to engage a highly rated university in a cooperative program that has real benefit for its officers. Representatives of both groups continue to meet to discuss how the program is working and seek ways to improve it. One of the more recent improvements has been the introduction of an option to complete the degree program remotely. With the continuing growth of the distance education capability at UMR, the option now exists for officers to complete the master's program at a distance if they are required to leave before completing all of the courses. As communication technology continues to advance, this option will get easier to use regardless of the officers' location.

Questions about this program may be addressed to Lahne Black at 573-341-4410 or at <*lahne@umr.edu*>.

Dr. Daughton is a professor and department chair of the Engineering Management and Systems Engineering Department at the University of Missouri-Rolla. He holds a debriefing session with each class that completes the program.

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("Keystone Manual," continued from page 6)

- Appendix J – Engineer Field Manuals and Related Joint Publications

Additionally, the December council recommended that two overarching themes guide the development of this revision:

- Primacy of the Warfighting Functions
  - Leverage engineer links to the warfighting functions to define the Regiment.
  - Adopt warfighting functions as our common language.
- Criticality of Engineer Command and Control and Staff Integration
  - Include functional and multifunctional command and control structures.
  - Emphasize engineer staff participation at all levels (to include sustainment-type units). Define doctrinal requirements, even if specific engineer staff and command and control structure doesn't currently exist organically at the proper locations in the force.
  - Broaden the description of engineer staff responsibilities to include new roles and selected historical roles that have not been focused on in the past.

Production and Publication

The writing team is currently preparing the first draft (author draft), which will be completed in time for a presentation and discussion during ENFORCE 2007. Based on the guidance from the review of this document and this meeting, a second draft (initial draft) will be completed in June 2007. The initial draft will be sent out for Armywide staffing, to include a focused review within the Regiment. After the comments from that staffing are received and adjudicated, a final draft will be prepared in time for a final Council of Colonels in late 2007. Other working group actions and council dates will be developed as necessary to support the production of the manual for the Regiment. The publication of this latest version of FM 3-34 is projected for fall 2008. Your participation is necessary to help make this 21st edition of the Regiment's keystone manual relevant and used by all leaders in the Regiment and the Army.

Lieutenant Colonel Lefler is the Chief of the Doctrine Development Division at the United States Army Engineer School, Fort Leonard Wood, Missouri. He is a registered professional engineer in Nebraska and a Project Management Professional.

Lieutenant Colonel Supplee (Retired) is a senior military analyst with the Army Program Office of Advancia Corporation, based in St. Robert, Missouri. His last active duty assignment was as the Operations Branch Chief for the Office of the Chief of Engineers at the Pentagon.

Army Civilian Corps

By Ms. Karin Gan

In addition to its Officer Corps and Noncommissioned Officer Corps, there is now a new corps in the Army family—the Army Civilian Corps. The establishment of this corps was announced to Army personnel in a 19 June 2006 memorandum signed by General Peter J. Schoomaker, then Chief of Staff of the Army, and Dr. Francis J. Harvey, then Secretary of the Army.[1] In the memorandum, they stated that Army civilians have a 230-year record of service and are extremely critical to the total Army force structure. *Army Civilian Corps* is a fitting title for this group of people; the name helps unify the Army civilian service and exemplifies the commitment of these dedicated individuals.

The memorandum further stated that Army civilians serve in all theaters and are deployed throughout the world in support of the Army's missions, to include the Global War on Terrorism. Not only do they assist with many of the reconstruction projects in Iraq and Afghanistan, but Army civilians are also being recruited to fill other positions to support the war.[2] And here at home, they help train Soldiers for deployment and maintain the facilities while the Soldiers are away, defending our country. As the missions have evolved and become more complex, so have the roles of Army civilians. In addition, the stability and continuity that the civilians provide is invaluable in keeping the Army at a high state of readiness.

Like their uniformed counterparts, Army civilians are committed to selfless service in the performance of their duties. This is illustrated in the Army Civilian Corps Creed,[3] which defines the purpose and role of Army civilian employees (see Figure 1).

Army Civilian Corps Creation

The creation of the Army Civilian Corps resulted from a study conducted from August 2001 through February 2003 by the Army Training and Leadership Development Panel (ATLDP).[4] Through this study (which involved 40,000 civilians, using written and online surveys, focus-group sessions, and personal interviews), the panel of senior civilian and military subject matter experts were able to determine the needs and concerns of Army civilians.

One thing that the study revealed was that Army civilians were not being adequately trained for leadership roles. "The Army grows and develops the best Soldiers in the world—and trains them to be leaders. However, growing Army civilian leaders has fallen short of that requirement."[5] As the Army transforms, the reliance on the civilian workforce will increase.

Army civilian leaders of the 21st century must be well-trained so they can support our Soldiers to their fullest potential. They must be *pentathlete* leaders—multiskilled strategic and creative thinkers who can build leaders and teams. Figure 2 shows the skills and attributes[6] needed to become pentathlete civilian leaders who personify the Warrior Ethos in all aspects, from warfighting support, to statesmanship, to business management.[7]

Civilian Education System

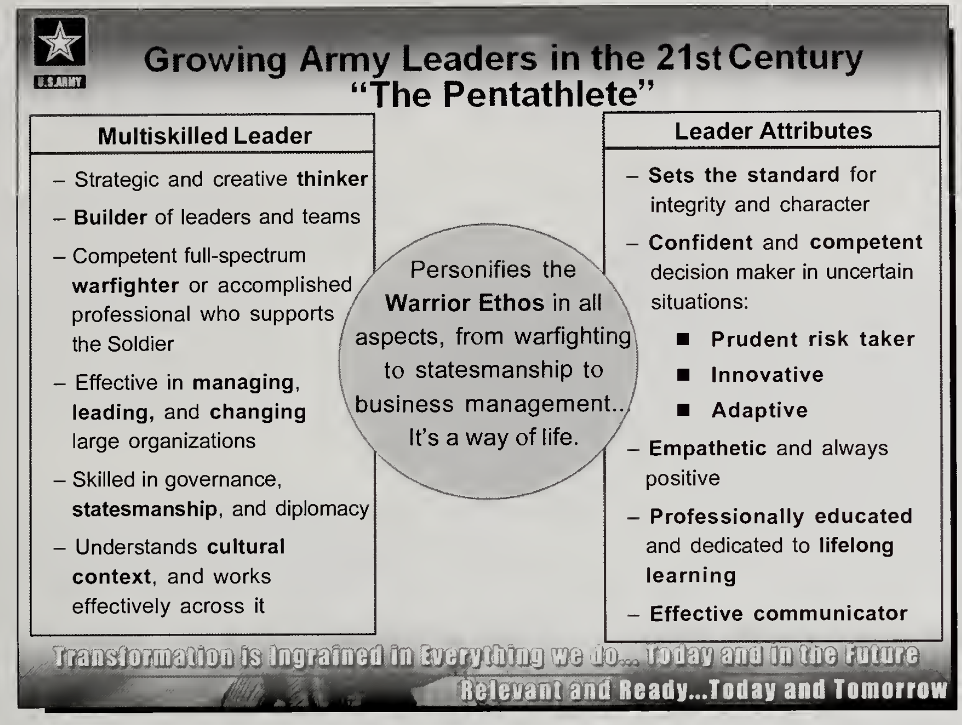
The ATLDP recommended four "imperatives" designed to help develop Army civilians and grow leaders: accountability, lifelong learning, interpersonal skills, and Army culture.[8] "Like their uniformed counterparts, Army

U.S.ARMY

Army Civilian Corps Creed

- **I am an Army Civilian – a member of the Army Team**
- **I am dedicated to our Army, our Soldiers, and Civilians**
- **I will always support the mission**
- **I provide stability and continuity during war and peace**
- **I support and defend the Constitution of the United States and consider it an honor to serve our Nation and our Army**
- **I live the Army values of Loyalty, Duty, Respect, Selfless Service, Honor, Integrity, and Personal Courage**
- **I am an Army Civilian**

Figure 1



Growing Army Leaders in the 21st Century
"The Pentathlete"

Multiskilled Leader

- Strategic and creative **thinker**
- **Builder** of leaders and teams
- Competent full-spectrum **warfighter** or accomplished professional who supports the Soldier
- Effective in **managing**, **leading**, and **changing** large organizations
- Skilled in governance, **statesmanship**, and diplomacy
- Understands **cultural context**, and works effectively across it

Personifies the **Warrior Ethos** in all aspects, from warfighting to statesmanship to business management.. It's a way of life.

Leader Attributes

- **Sets the standard** for integrity and character
- **Confident** and **competent** decision maker in uncertain situations:
  - **Prudent risk taker**
  - **Innovative**
  - **Adaptive**
- **Empathetic** and always positive
- **Professionally educated** and dedicated to **lifelong learning**
- **Effective communicator**

Transformation is Ingrained in Everything we do... Today and in the Future

Relevant and Ready...Today and Tomorrow

Figure 2

civilians must be well-developed, motivated, and forward-thinking to meet the challenges of the 21st century."[9] They "require a leader development education structure parallel to that of their uniformed counterparts."[10]

Toward that end, a new Civilian Education System (CES) is being developed and staffed with the major commands. Phase 1 began in January 2007; additional phases will begin as the CES program develops.[11]

The CES plan includes four courses that are sequential and progressive:[12]

- *Foundation Course (FC).* This course is for civilians entering the Army with various levels of previous experience. It is entirely distributed learning (dL). Students will learn to understand and appreciate Army values and customs, serve professionally as a member of the Department of the Army, acquire foundation competencies for leader development, develop effective communication skills, and be ready to assume a first leadership role.
- *Basic Course (BC).* This course is for leaders who exercise direct leadership to effectively lead a team. It will be a combination of dL and a 2-week resident phase at the Army Management Staff College (AMSC) Fort Leavenworth, Kansas, campus. Students will understand and apply basic leadership skills to effectively lead and care for small teams, apply effective communication skills, and develop and mentor subordinates.
- *Intermediate Course (IC).* This course is for leaders who exercise direct and indirect supervision. It is a combination of dL and a 3-week resident phase at either the AMSC Fort Leavenworth or Fort Belvoir, Virginia, campus. Students learn skills to manage human and financial resources, direct program management and systems integration, display flexibility and resilience, and focus on the mission.
- *Advanced Course (AC).* This course is for leaders who exercise predominately indirect supervision. It is a combination of dL and a 4-week resident phase at the AMSC Fort Belvoir campus. Students become skilled in leading a complex organization, managing human and financial resources, leading change, inspiring vision and creativity, directing program management and systems integration, displaying flexibility and resilience, and focusing on the mission.

Legacy leader development courses such as Leadership Education and Development (LEAD), Leadership Education and Development Train the Trainer (LEAD TTT), Organizational Leadership for Executives (OLE), Personnel Management for Executives (PME) I and II, Strategic Leadership Education (SLE), and Sustaining Base Leadership and Management (SBLM) have been phased out and will be replaced by, or incorporated into, the four CES courses.[13] Information on dates and location of the classes will be posted on the AMSC website at <*http://www.amsc.belvoir.army.mil/ces/*> and in the Civilian Leader Development Transformation Community on Army Knowledge Online (AKO).[14]

Another result of the panel was the November 2004 establishment of the Civilian Advisory Board.[15] The purpose of this board is to—

- Provide the Chief of Staff, Army, and his staff with professional advice and assistance in matters pertaining to the civilian work force.
- Serve as a representative and advocate for Army civilians in matters raised to the Chief of Staff, Army.

- Strengthen the bonds between uniformed and civilian members of the Army.
- Highlight the importance of keeping Army civilian workforce issues integrated into the Army planning process. Advance training and leader development to the forefront of Army priorities.

Conclusion

According to former Chief of Staff of the Army Schoomaker and former Secretary of the Army Harvey, Army civilian employees of yesterday, today, and tomorrow are—and will remain—an integral part of the Army team. They have earned this distinction because of their vital service to the Nation and the Army.[16] To support our Soldiers as they carry out the Army's missions, the Army Civilian Corps, too, must be *Army Strong*.

Personal Observations

Growing up as an "Army brat," I learned from my father a deep respect for my country, the American Flag, and the United States Army. I began my civil service career straight out of high school as a Federal Junior Fellow, GS-2, in the Civilian Personnel Office at Fort Leonard Wood, Missouri. During the time I was completing my college degree, I was very lucky to have supervisors and mentors in the Civilian Personnel Office who personified and enforced in me the importance of my responsibilities as an Army civilian and of giving 100 percent while performing quality work.

The Army Civilian Corps Creed should be a reminder to civilian employees that our purpose is to serve and support—our country, our Army, and our Soldiers. We made that choice when we decided to work in the public sector rather than in the private sector. And we are truly fortunate to have that opportunity. Take a moment to study the creed. Most will find that not only do we practice these beliefs, we also understand and support them.

Although there will always be some Army civilians who fail to live up to their commitment and, as a result, cause all of us to be viewed negatively by some Soldiers, they are far outnumbered by the many who strive to support the Army's mission and to protect our country and our Constitution. Most of us take pride in being part of the Army Civilian Corps and look forward to transforming with this great Army team.

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[3] Army CPOL, "Army Civilian Corps Creed," <*http://cpol.army.mil/library/general/acccreed.html*>, accessed on 14 February 2007.

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[15] Department of the Army, "Civilian Advisory Board (CAB)," memorandum, 14 December 2004.

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WINTER ROAD CONSTRUCTION

By Captain Becky L. Lapidow

Photo by Sergeant First Class Mark Ferron, Task Force Eagle

While cold weather and freezing temperatures may stop the Taliban, harsh conditions don't stop Task Force Eagle. These Soldiers are committed to building roads to help the people of the Islamic Republic of Afghanistan. Although at times the ground is freezing and road construction is limited because of the bad weather, the local nationals of Afghanistan and American Soldiers continue their work when the weather permits because they know that accomplishing this mission will benefit many. They use four different types of equipment, including a dozer to cut the ditches and push fill onto the road, a sheep's foot roller to break up frozen dirt and start compaction on the 18 to 24 inches of fill, a smooth-wheel roller to finish the soil and compact the gravel, and a grader to cut the final grade on the road and spread the gravel.

Photo by Sergeant First Class Mark Ferron, Task Force Eagle

A high-speed compactor breaks up frozen chunks of soil and compacts it to strengthen the subbase.

First, snow is removed from the existing area far enough for two days of work. Then, dozers are used to rip up the frozen ground in small increments. Workers are careful not to rip open too much earth in case snow falls overnight and fills the holes with frost and moisture. The dozers then push fill material into the existing road and push frozen and dry material onto the road. The sheep's foot roller is then used to roll over the material to break up the frozen chunks of dirt and mix the dry and frozen material together. After a base course (the subbase layer of an asphalt roadway) is compacted, the grader is rolled over it to ensure that the road is even. The smooth-wheel roller is used to compact the top 4 to 6 inches of road.

The next day, the top 2 inches of the road are final-graded, and 3 inches of well-graded #5 gravel are spread, graded, and compacted once more. While this is being done, other

(Continued on page 49)

Dive Team Implodes Building on Kwajalein Atoll

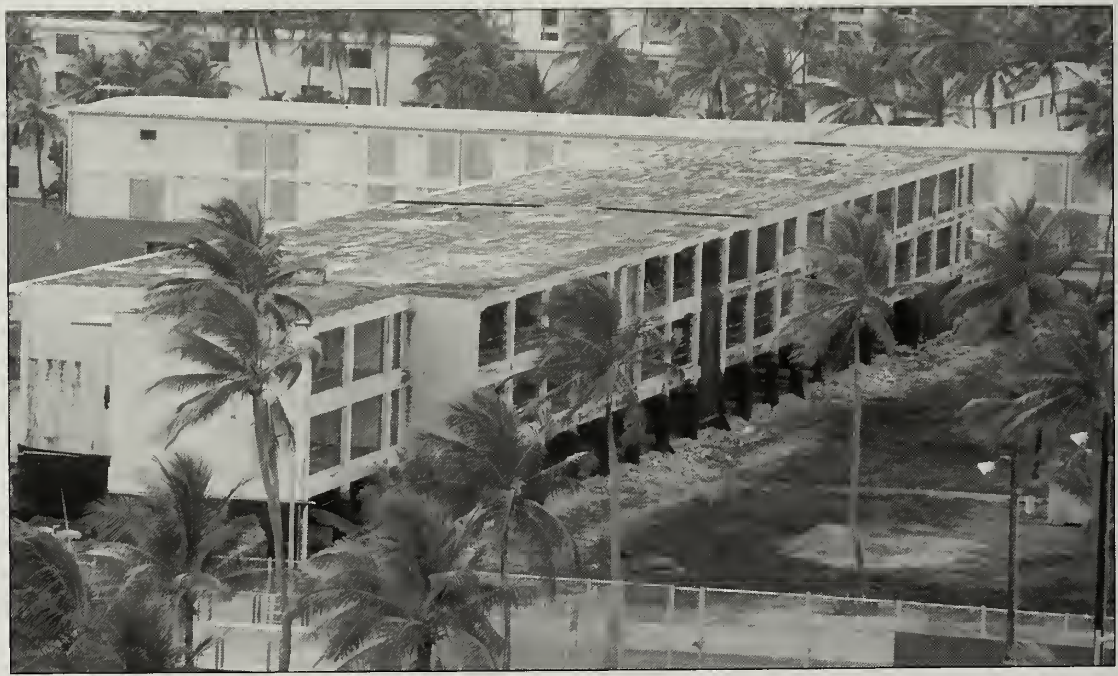
By Captain Charles T. Denike

Kwajalein Atoll, the largest coral atoll in the world, is part of the Republic of the Marshall Islands in the western Pacific Ocean. Since 1944, when the United States captured the atoll from the Japanese, it has been used for military purposes. Unaccompanied personnel who are assigned there live in apartment-style housing. When one of these buildings (Building 708) was determined to be unsafe for occupancy, plans were made to implode the building to make way for a new structure.

The project, which was accomplished in July 2006, took place in two phases: an *explosive demolition* conducted by the 7th Engineer Dive Team, 29th Engineer Battalion, and a *mechanical demolition and debris removal* conducted by the 82d Engineer Company (Engineer Support Company [ESC]). The dive team detonated 84 pounds of M1 dynamite, bringing the three-story, 450-foot-long building to the ground. Imploding the building facilitated the mechanical demolition by reducing the height of the structure by at least half and catastrophically damaging the entire structure. A blast of this type had never been performed with military explosives and required extensive research and planning.

Preparation

From March through June, Kwajalein Range Services (KRS) conducted soft demolition of the building, which included removing all glass, interior walls, paint, electrical wires, plumbing, fixtures, and furniture. KRS also installed window barricades on surrounding buildings to protect against glass breakage, but did not remove the building's four stairwells, each of which went to the third floor and was surrounded by secondary columns and concrete masonry unit (CMU) walls. While not designed to be load bearing beyond the limits of the stairwells, these columns and walls were strong enough to withstand a substantial load. With the time allowed, the 82d Engineer Company was able to remove three of the four stairwells on the first floor.



Glass and other interior components were removed from Building 708 in preparation for the implosion.

Demolition

The blast team placed the M1 charges inside the columns surrounding the stairwells. To do so, they drilled boreholes 1.375 inches in diameter and 13 inches deep at elevations of 2 and 6 feet into the north faces of each column to protect the M11 blasting caps from fragmentation. After drilling the boreholes, the blast team and KRS installed a chain-link fence and a nonwoven geotextile fabric curtain around the south, west, and north sides of the first floor.

The blast team conducted a test shot on 6 July to verify the charge quantity and placement. The M1 dynamite completely breached the column at the charge placements. The remaining concrete at an elevation of 4 feet was severely displaced, and the rebar was deformed. The chain-link fence and nonwoven geotextile fabric wrap remained intact. The test shot confirmed the proposed plan, and the blast team loaded the structure with explosives for the blast.

The team primed 168 charges, loaded them in the boreholes, and stemmed the boreholes with expanding foam. They wrapped all 84 columns with two layers of chain-link fence and nonwoven geotextile fabric to contain fragmentation. On each column, the chain-link fence was secured with four hog rings and the nonwoven geotextile fabric was secured with three wire ties. Four M15 high- and low-strength time delay blasting caps (two primary and two secondary systems) were used, and two M11 high-strength blasting caps were used to create the 225 milliseconds delay between each of the eleven sequences that detonated consecutively from the south to the north end of the building. The net explosive weight (NEW) of each sequence was 8.92 pounds and the total NEW for all sequences was 94.45 pounds. Since the sequences were delayed 225 milliseconds (more than the industry standard of 8 milliseconds), the entire blast was modeled with a NEW of 8.92 pounds. The blast was initiated with two M81 igniters (primary and secondary) and two M13 (1,000-foot) low-strength blasting caps.

The blast collapsed the entire first floor, 75 percent of the second floor, and 50 percent of the third floor. The final stairwell that was unable to be removed on the first floor supported some of the structure during the collapse. Portions of the second and third floor remained supported since the stairwells had not been removed above the first floor.

Quantity-Distances

The most significant deviation from normal military explosive procedures was the use of reduced safe distances. The blast team used a distance of 681 feet for the blast (both the test shot and the entire building) and 200 feet for accidental detonations. The quantity-distance was calculated using the equation:

$$D\,(\text{ft}) = K \times W^{1/3}$$

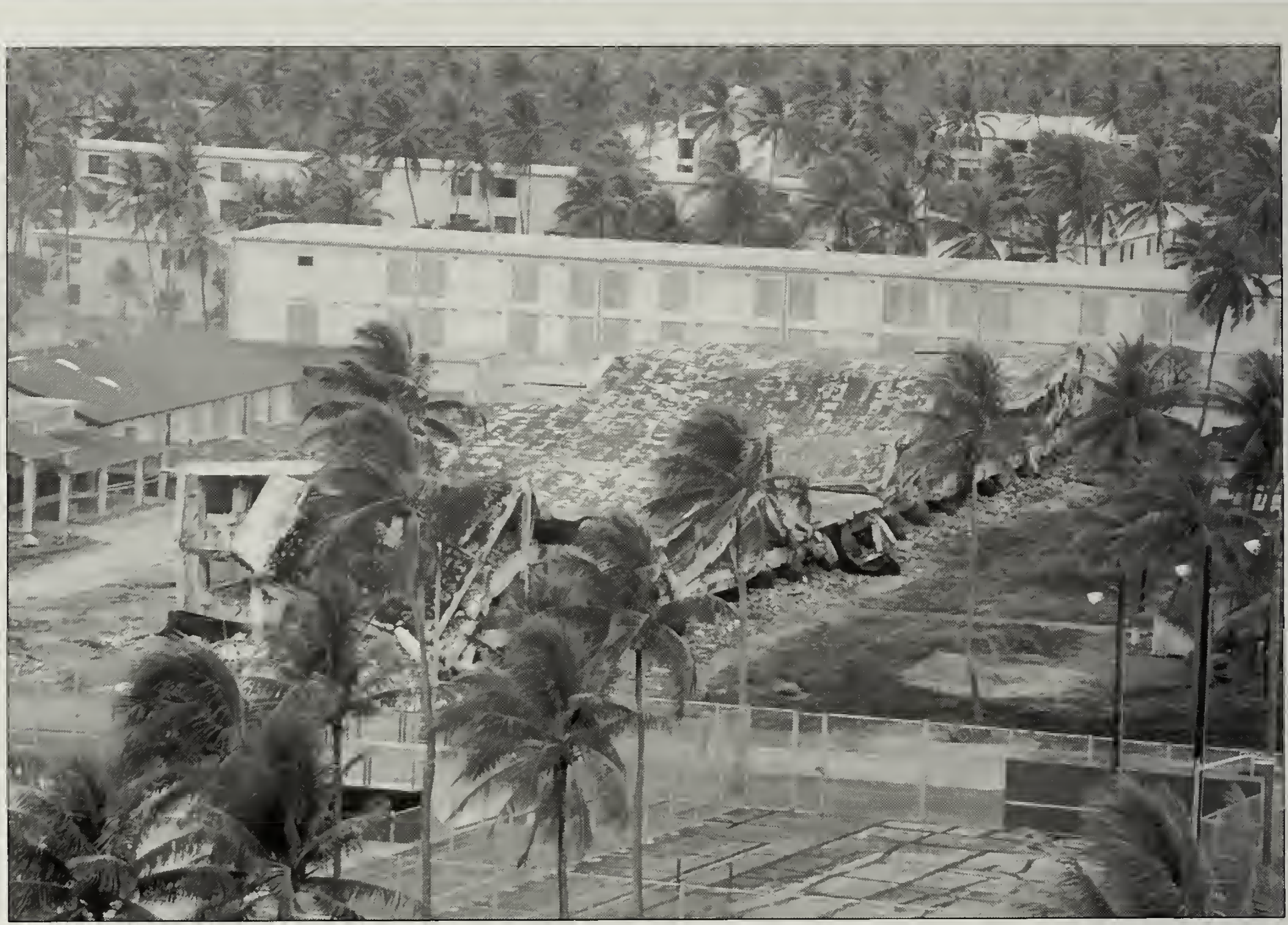
D is the distance in feet, K is a factor (also called K-factor) that is dependent on the permitted risk level, and W is NEW in pounds. For accidental detonations, a K-factor of 40[1] is normally used; however, this distance does not account for fragmentation. Therefore, a distance of 200 feet was used for accidental detonations. For intentional detonations, a K-factor of 328[2] was used, representing an incident overpressure of 0.0655 pounds per square inch at the calculated distance. This resulted in a distance of 681 feet and accounted for the dangers of overpressure. There was no concern of fragmentation because control measures were in place to limit the distance that fragmentation was thrown.

Blast Considerations

Concerns about fragmentation included the distance of flying debris, damage to neighboring buildings, and damage to initiation systems. The fragmentation could have caused window breakage in neighboring buildings and severed the sequences. Fragmentation was mitigated using three methods:

- Using protective materials at the charge placement. Each column was wrapped with two layers of chain-link fence and two layers of nonwoven geotextile fabric that reduced the number of fragments projected from the column and their speed. The wrap contained 95 percent of the fragmentation on the test shot column. Additionally, the

Each column was wrapped with two layers of chain-link fence and nonwoven geotextile fabric to contain fragmentation.



The building was reduced by at least half by the blast.

maximum fragment throw distance for the remaining 5 percent was 20 feet.

- Covering the first floor openings on the south and west sides, two pedestrian doors on the north side, and the first 60 feet of the east side from the north with a chain-link fence curtain and nonwoven geotextile fabric. The fence was secured at the top, but allowed to hang free at the bottom. The fabric was 15 feet high, providing enough fabric lying on the ground to secure with sandbags once installed over the fence. The fabric had enough slack to allow it to move if impacted by fragmentation and decelerate the fragment instead of allowing the fragment to pierce the fabric.
- Covering all exposed initiation system components inside the building with two layers of sandbags. This significantly reduced the chance of misfires due to components being severed from flying debris. After analyzing the results of the blast, the team thought that a single sandbag layer covering the detonation cord and a double sandbag layer over the initiator components would have been sufficient. Covering the detonation cord with sandbags also provided suppression of blast overpressure since the detonation cord was exploding in free air lying on the building floor.

KRS installed 3/4-inch plywood barricades over windows and air conditioning units in close proximity and facing the building to protect against flying debris and constructed a barricade around a nearby building.

Since the charges were positioned inside the columns, blast overpressure was not a major concern. The amount of explosives used per charge was the minimum amount needed to achieve the desired blast results. The majority of energy of the blast overpressure was directed within the borehole, resulting in breaching of the column. Once the column was breached, there was minimal overpressure remaining to impact surrounding structures or personnel.

"Great strides were achieved while planning for the implosion-style blast in a confined urban environment..."

Ground shock was negligible due to the coral substrate, height of the structure, and amount of explosives used. It is common practice to measure vibration at surrounding buildings using a seismograph; however, the blast team did not have equipment to support this. For future operations, this might be added for research and training value. For a larger structure, seismographic measurements would be a requirement.

Conclusion

Building 708 detonated and collapsed as planned, with no damage to surrounding structures. The sequences detonated from south to north to control the fall of the structure away from nearby buildings—the building successfully fell down onto its own foundation. Portions of the building between the second and third floor stairwells that remained intact went into complete progressive collapse, showing the significance of leaving those stairwells in place. This result was acceptable since reducing the structure height by one floor brought the entire structure within reach of the hydraulic excavators for mechanical demolition. However, removing the stairwells on the second and third floors would have caused the building to completely collapse and should be pursued on future operations.

Great strides were achieved while planning for the implosion-style blast in a confined urban environment since it required nonregulation minimum distances and used nonstandard methods for employing military explosives. This experience was an invaluable training opportunity and demonstrated greatly expanded capabilities of military explosives for future operations.

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Endnote

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Note: The techniques and procedures presented in this document are the opinion of the author and other personnel consulted for endorsement due to their technical background and expertise. Adherence to these techniques and procedures provided an acceptable level of safety; however, they don't guarantee a risk-free operation or address every possible situation that occurred. The blast team was responsible for addressing unexpected conditions based on technical knowledge. The use of explosives to collapse the building was inherently dangerous, but extensive control measures were followed to conduct the operation safely.

("Road Construction," continued from page 45)

Photo by First Lieutenant Keith Muehling, Task Force Eagle

After graders smooth the road and create ditches, the smooth-wheel roller compacts the dirt.

Soldiers grade and compact the ditches along the side and complete the finish work. This process may sound easy, but when the top 12 inches of road are frozen, it is not a simple task.

The road that Task Force Eagle is working on is important to the local population for many reasons. First of all, it connects towns (over a 100-kilometer stretch) that were previously isolated from one another. This has significant economic impacts because these towns can now trade and export among each other. The road allows the small village governments to communicate and become a stronger government. The road also impacts education and health care because it is now easier to get to school or see a doctor when needed. But most importantly, Afghan local nationals are helping with the project by providing gravel, fuel, and water used in construction, which creates jobs for the local populace. In turn, the Afghan workers learn how to care and maintain the roads themselves, helping to make them autonomous once coalition forces leave the country.

This is why Afghan local nationals and Task Force Eagle Soldiers, although facing harsh and at times impossible conditions, continue their construction efforts. Afghanistan needs the benefits of roads, no matter what the season. Afghan workers and coalition forces understand this and will continue building this road until their project is completed.

Captain Lapidow is the Public Affairs Officer for Headquarters and Headquarters Company, 37th Engineer Battalion (Combat). Previous assignments include executive officer, platoon leader, and assistant S-1 for the 37th Engineer Battalion. She has attended the Engineer Officer Basic Course, Airborne School, the NBC Defense course, and Jumpmaster School and holds a bachelor's in earth and environmental sciences from Lehigh University, Bethlehem, Pennsylvania.

Photo by Peter Shugert, U.S. Army Corps of Engineers, New York District

USACE-Navy Team Frees the USS Intrepid

By Dr. JoAnne Castagna

Felix Novelli was 19 years old when he was assigned to the *USS Intrepid* during World War II. He clearly remembers the horror and splendor he experienced while onboard the aircraft carrier, including the first attack.

"I was standing on the flight deck when a twin-engine Japanese dive-bomber attacked from the fantail. He came along the starboard side when one of our guns hit him, blowing his wing off and sending it into the ship, causing a very bad fire," said Novelli, who saw many of his "brothers" being killed and wounded.

Novelli witnessed numerous attacks during the war, to include many kamikaze attacks that blackened the sky. They kept on coming from the left and the right, 200 to 300 each day, trying to sink the *Intrepid*. She was hit five times by kamikaze bombers.

In addition to its World War II service, the 925-foot-long ship saw action in the Korean and Vietnam conflicts. "The Ghost Ship," as she was known by the enemy, tracked Soviet submarines during the Cold War and served as the National Aeronautics and Space Administration's prime recovery vessel for Mercury and Gemini capsules in the 1960s.

In 1981, the aircraft carrier was saved from being scrapped when it was purchased by the Intrepid Foundation, a charitable organization started by the New York City-based Fisher construction and real estate family. The

Photo by Peter Shugert, U.S. Army Corps of Engineers, New York District

The *USS Intrepid* docked at Pier 86 on the Hudson River on Manhattan's west side.

foundation, through its Fallen Heroes Fund, the Center for the Intrepid, and Fisher Houses, responds to the hardships of military service and meets a humanitarian need beyond that normally provided by the Department of Defense. Fisher Houses are located at military hospitals worldwide and provide assistance to the families of critically injured servicemen and servicewomen. Novelli, who also supports these programs, says that every time a Fisher House is opened, American flags are raised from the *Intrepid* flight deck and then presented to the Fisher House at a ceremony.

In 1982, the retired warship became the Intrepid Sea, Air, and Space Museum. It is the world's largest naval museum and has been berthed at Pier 86 on Manhattan Island in the Hudson River. After 24 years as a museum, officials of the Intrepid Foundation decided that the ship needed repairs and refurbishment, as well as a rebuilt public pier to serve the 700,000 visitors each year.

In August 2006, the museum received a federal permit from the United States Army Corps of Engineers® (USACE) to dredge an access channel from the berthing area to the main federal channel of the Hudson River to move the vessel to Bayonne, New Jersey, where it would undergo inspection and necessary repairs. The dredging operation, which was completed in October, removed approximately 16,000 cubic yards of river mud.

Photo by Peter Shugert, U.S. Army Corps of Engineers, New York District

USACE vessels *Gelberman* and *Hayward* lead the flotilla as the *USS Intrepid* is towed stern first down the New York Harbor, en route to its temporary dock in Bayonne, New Jersey.

On 6 November 2006, an "*Intrepid* on Leave" celebration was conducted by Intrepid Foundation officials to give the ship an elaborate send-off to its temporary home. Several public service agencies' vessels were invited to escort the ship downriver, with four USACE workboats leading the flotilla. During this initial attempt to remove the engineless ship, seven tugboats began to pull, and the *Intrepid* literally got stuck in the mud.

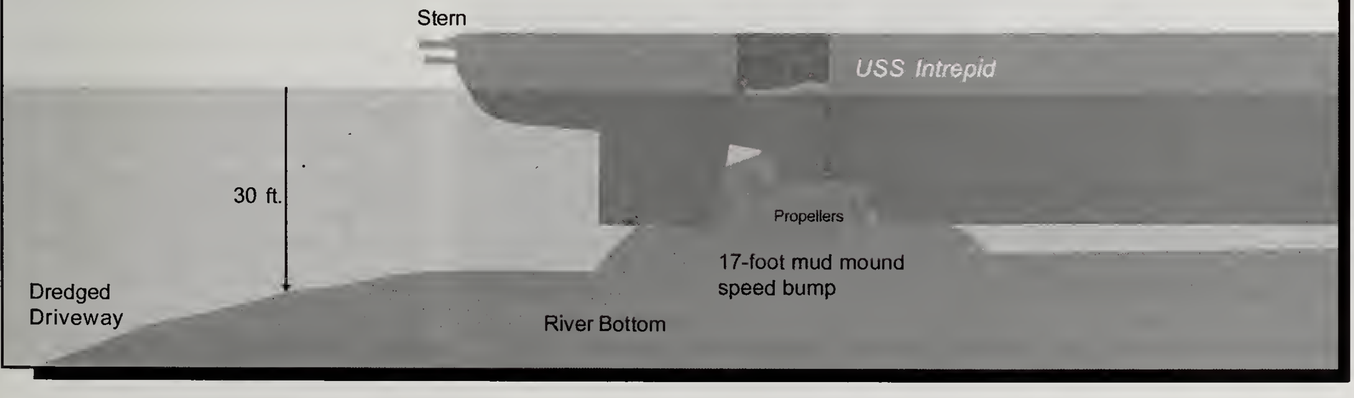
The 27,100-ton ship moved backward, stern first, about 15 feet before its four giant propellers, each measuring 16 feet in diameter, dug into the river sediment and prevented any further movement. Try as the straining tugboats might, the *Intrepid* would not budge. The effect was a compacted "speed bump" of mud under the ship's fantail (see figure below).

Museum officials immediately called numerous government agencies for help, including Pentagon officials. The USACE New York District, the closest federal agency with expertise, responded within 2 hours with its district commander and technical experts on the adjacent pier assessing the situation.

The stern of the ship was 2 feet higher than the bow. At low tide, the ship was only resting on the bow and the stern's speed bump. This was adding serious stress to the hull, according to the District Chief of Operations. This was not a simple matter of more dredging, but

In the initial attempt to tow the *Intrepid* out, a mound of mud plowed up around the propellers and shafts. The ship only moved 10 or 15 feet.

The Challenge: Dredge 300 feet from the stern toward the bow along the port side and remove the speed bump.



a grounded ship that needed to be carefully freed.

USACE recommended that *Intrepid* officials contact United States Navy salvage experts, since they have unique knowledge and experience in freeing large ships. They would also know how the *Intrepid* would react to being in such a precarious situation. The next day, the United States Naval Sea Systems Command (NAVSEA) salvage contractor had an assessment team at the *Intrepid.* Salvage divers surveyed below the waterline to inspect the vessel for damage and determine the extent of the speed bump. The divers' firsthand examination confirmed the initial assumptions and documented the extent of the problem. Soon the Navy was working with USACE, the Intrepid Foundation, and state and city agencies to execute a unique and highly visible dredging operation to remove compacted sediment from around the propellers and shafts.

The Navy brought technical and contractor expertise to the partnership, and USACE provided project oversight and integration. Because this is their home area, District team members had the local knowledge and existing relationships with stakeholders, government agencies and officials, and the media. This mission was executed as a joint military operation with daily progress meetings and situation reports. The team devised a three-phase execution plan.

- Dig the existing access channel deeper and wider and add an access trench on the south side of the vessel from the *Intrepid's* stern to beyond its trapped propellers and shafts.
- Use a drag bar under the stern and rake the sediment out.
- Airlift or vacuum the remaining mud from under the ship's fantail.

Crews worked around the clock to remove the mud in 29 days, before the next high tide, which would provide an extra 5 feet of water to remove the ship. That was their best shot at freeing the vessel, and they didn't want to miss the opportunity.

Work also moved swiftly due to environmental concerns over the *Intrepid's* precarious state. Her hull plates could separate and leak petroleum-contaminated bilge water—which was to be removed and environmentally disposed of during the shipyard visit in Bayonne—into the river. Also concerned about the return of anadromous fish species to the river estuary for the winter spawning season, work continued so the fish would settle into other parts of the estuary. Since the weather and the river temperatures were remaining unusually warm, the return of the fish was delayed. Because of this and the urgent need to dredge, the Intrepid Museum received extended work permits from USACE and the New York State Department of Environmental Conservation to allow the dredging to start a week after the grounding.

An environmental dredging bucket was used to minimize any adverse water quality and fisheries impacts. The clamshell bucket is fitted with gaskets over the openings so dredged material stays inside the bucket and the water goes back into the river. First, the existing dredged access channel to the main channel was deepened and widened. Then, to start access under the ship, a 150-foot-long by 30-foot-wide by 35-foot-deep trench was dredged down the starboard (outboard) stern side of the ship, from the *Intrepid's* stern to beyond the propellers and shafts encased in mud. Unfortunately, the access trench could not be dug directly beside the hull because the flight deck overhang prevented the crane dredge from coming up next to the ship.

To overcome this, a drag-bar barge was moved under the flight deck alongside the hull, where the drag-bar blade was lowered to the shallow bottom. Then, pulling the barge and blade away from the ship, the bar raked the river mud into the trench, working like an underwater bulldozer. The plowed mud was then dredged out of the trench, and the process was repeated until the 35-foot trench expanded all the way to the ship's hull. As the trench approached the hull, river mud that fell into the trench from under the fantail and around the propellers and shafts was raked by the drag bar and removed by the environmental bucket dredge.

The ship needed 28 feet of water to be extracted from its berth. As divers and hydrographic survey crews measured progress next to and under the ship, they saw that the propellers and shafts on the starboard (outboard) side of the ship were nearly exposed as the mud was sloughing down into the trench. These in-progress investigations, together with the experience of the salvage crew, prompted officials to extend the access trench an additional 150 feet toward the bow. The extended trench allowed the

Photo by Dan Desmet, U.S. Army Corps of Engineers, New York District

As it passes Ground Zero, a 100-foot American Flag is unfurled by *USS Intrepid* veterans as a tribute to the lives lost there on 11 September 2001.

Photo courtesy of USS Intrepid Sea and Air Space Museum

The *USS Intrepid* receives a water cannon salute in New York Harbor as the ship pauses near the Statue of Liberty.

ship to be pulled both sideways from the pier and backward toward the main channel before being extricated from the remaining mud on the port side.

After almost 3 weeks of work and the removal of approximately 39,000 cubic yards of river mud, divers were able to touch the exposed propellers and shafts, showing that the dragging and dredging operations were working and the ship would soon be ready to tow. Luckily, the slow and inefficient airlifting method would not have to be used.

One of the biggest challenges was the availability of dredged material processing barges. To ensure that an empty barge was next to every dredge, the New York City Economic Development Corporation and the Department of Sanitation worked jointly to locate and track barges around the clock so the dredging cycle could continue.

Another challenge was how to beneficially use the dredged material. The 39,000 cubic yards of river mud were transported and processed in fifty-three New York City Department of Sanitation barges. The sediment was tested for pollutants and found to be acceptable for reuse. Portland cement was added to each barge load and thoroughly mixed, which chemically and structurally stabilized the dredged material, capturing any pollutants in the processed material. It was then used as interim cover in the closure of New York City's former Fresh Kills landfill at Staten Island. Once the largest landfill in the world, it is being transformed into reclaimed wetlands, recreational facilities, and a landscaped public park.

On 6 December 2006—the 29th day of the emergency operation—officials from the Intrepid Foundation, USACE, and the Navy, as well as *USS Intrepid* veterans (including Felix Novelli) and the media, stood on the *Intrepid's* flight deck. The ship was surrounded by tugboats, USACE harbor workboats, United States Coast Guard cutters, New York City police boats and fireboats, and a flock of helicopters. It was the coldest morning of the year—with constant winds of 10 to 20 knots from the west pushing against the ship—and the Hudson River's high tide and slack water were not at the same time. When the tide was the highest, the river's strong current had not stopped yet and was still running upriver at more than 5 knots. The tugboats had to extract the *Intrepid* with great force and finesse, pulling the ship at a 5-degree angle away from the remaining mud in the berth, while maintaining tight control so it didn't swing out and crash back into Pier 86 as it entered the swift river currents.

After 29 minutes of relentless pulling by five powerful tugboats and the combined force of 21,000 horsepower, the *Intrepid* moved forward. The ship moved gracefully out of the berth, through the newly dredged access channel, and out to the main Hudson River federal channel in a slow but majestic voyage 5 miles down the Hudson River.

On the way downriver, the *Intrepid* slowed slightly while passing the World Trade Center site, as twenty former crewmembers unfurled a 100-foot American flag to honor those who died there on 11 September 2001. The *Intrepid* paused again briefly while passing the Statue of Liberty en route to the ship's temporary home, the Bayonne Dry Dock Company at the former United States Army Military Ocean Terminal in Bayonne, New Jersey. There the 63-year-old ship began a long-overdue refurbishment, after which it will be moved to Staten Island, New York, for interior renovations before returning to a rebuilt Pier 86 in late 2008.

Seeing the *Intrepid* move again was inspiring for Novelli, who stood on the flight deck like he did as a teenager. "It was like I was a kid, waking up on Christmas morning and finding a nice set of electric trains under the tree. You're filled with joy. I was back at sea and 19 years old again. A million thoughts came back. My main thought being the kids that we left on the floor of the ocean."

For more information about the Intrepid Sea, Air, and Space Museum, please visit <www.intrepidmuseum.org>.

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FIREFIGHTING UNIT LEADERSHIP:
An Opportunity for Change

By Captain Max Hanna

United States Army firefighting detachments are sorely needed for airfield and base camp operations throughout the current operating environment. These units fulfill a very important function for the Army—that of force protection through reduction or elimination of fire hazards. While deployed, these detachments also provide vital mission support in the form of vehicle crash rescue, confined space rescue, high angle rescue, and immediate hazardous materials (HAZMAT) response. Nearly all of the military occupational specialty (MOS) 21M (firefighter) Soldiers are either professional or volunteer firefighters in their civilian careers and practice these skills on a regular basis. All but one of the military firefighting detachments are either United States Army Reserve or Army National Guard units.

The unit commander is usually a first lieutenant or a junior captain. According to the modified table of equipment (MTOE), they are the fire marshal—with responsibilities ranging from morale, safety, training, maintenance, preparation for deployments, and development and implementation of fire protection plans. If this fire marshal is the only engineer officer attached to an aviation brigade, he is likely assigned the additional duty of brigade staff engineer liaison officer and a myriad of other duties.

With only rare exceptions, these officers have no firefighting experience, which puts them at a distinct disadvantage. Firefighting is not taught in any engineer officer courses, to include the Engineer Basic Officer Leader Course (BOLC), Engineer Captain's Career Course (ECCC), Combined Arms Exercise (CAX) Course, and Combined Arms and Services Staff School (CAS3). In fact, some engineer officers are not aware that firefighting detachments exist, much less that they fall under the giant umbrella of the Engineer Regiment.

The senior noncommissioned officer (NCO), or fire chief, is—according to the current MTOE—an E6 21M who has advanced through the ranks of the unit. Most fire chiefs have been 21Ms their entire career and have stayed in the same unit because it was the only firefighting detachment within the regional readiness command or the state. Without a doubt, they know their job. The fire inspector is an E5 or E6 and is typically only slightly junior to the fire chief. These two senior NCOs have a tremendous responsibility, especially on the fire scene. However, in a brigade or division setting, they carry little weight, even as an E7.

In order to be promoted to E7, most 21Ms have to move to another unit and accept another MOS. Only after that assignment can they move back to the firefighting detachment as the senior NCO. This prevents many NCOs, who have acquired very specialized skills, from staying in the detachments. Or, on the flip side, this situation develops a culture of homesteading—the tendency of personnel to find a unit and position and stay there until they are forced to retire. Given the Army Reserve/National Guard policy of promoting into slots, homesteading in these small units prevents junior enlisted personnel from being promoted to E5 without being reclassified. From my experience, the most often cited reason for 21M Soldiers leaving the Army after their initial contract ended is the inability to be promoted.

Based on my experience as fire marshal of the 369th Engineer Detachment (Firefighting) during Operation Iraqi Freedom Phase I, my recommendation is that the firefighting detachment MTOE be modified to replace the first lieutenant with a warrant officer 1 or warrant officer 2. Then provide the senior NCO in the unit an opportunity to advance by allowing him to attend the Warrant Officer Basic Course. As a warrant officer, the fire marshal would be recognized as the expert he is in his technical field and would have rank, stature, and respect during the brigade and division staff meetings that he attended.

At a minimum, the Warrant Officer Course should include the following plan of instruction:

- Senior-level firefighter courses (coordinated with the local Fire Academy)
- HAZMAT and confined spaces trainer courses (to train his Soldiers in these skills when he returns to the unit)
- Administrative duties (such as awards and NCO Evaluation Reports [NCOERs])

- Supply (accountability, supply discipline, and the forms required to maintain a multimillion dollar property book)
- Maintenance (specifically, maintenance procedures required for the specialized firefighting equipment)
- Risk assessment
- Practice in public speaking (to prepare for briefing division or brigade commanders)

With this change to the MTOE, these vital firefighting detachments would be similar in leadership structure to many geospatial mapping teams that are currently led by warrant officers. They could establish a professional detachment with capable and knowledgeable leaders and create better opportunities for advancement of junior Soldiers. This would also enable some engineer first lieutenants to fill other positions—such as platoon leader or company executive officer—which would better benefit the Army.

Captain Hanna served as Commander of the 369th Engineer Detachment (Firefighting) during its one-year deployment to Baghdad in support of Operation Iraqi Freedom Phase I.

Dedication

The following members of the Engineer Regiment have been lost in the Global War on Terrorism since the last issue of *Engineer*. We dedicate this issue to them.

Blohm, Private First Class Alan R.	425th Brigade Special Troops Battalion, 25th Infantry Division	Fort Richardson, Alaska
Bubeck, Sergeant John T.	9th Engineer Battalion, 1st Cavalry Division	Schweinfurt, Germany
Burrows, Private Joshua C.	8th Cavalry Regiment, 1st Cavalry Division	Fort Hood, Texas
Caldwell, Specialist Eric T.	8th Cavalry Regiment, 1st Cavalry Division	Fort Hood, Texas
Clevenger, Specialist Ross A.	Alpha Company, 321st Engineer Battalion	Boise, Idaho
English, Captain Shawn L.	577th Engineer Battalion, 1st Engineer Brigade	Fort Leonard Wood, Missouri
Fraser, First Lieutenant David M.	67th Armor Regiment, 4th Infantry Division	Fort Hood, Texas
Hamill, Captain Jason R.	67th Armor Regiment, 4th Infantry Division	Fort Hood, Texas
Henry Jr., Corporal Lorne E.	2d Brigade Special Troops Battalion, 10th Mountain Division	Fort Drum, New York
Holtom, Sergeant James J.	Alpha Company, 321st Engineer Battalion	Boise, Idaho
Kingman, Sergeant Jonathan P. C.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas
Love Jr., Staff Sergeant Robert L.	16th Engineer Battalion, 1st Armored Division	Giessen, Germany
McCormick, Private Clinton T.	2d Brigade Support Battalion, 2d Infantry Division	Fort Carson, Colorado
McPeek, Specialist Alan E.	16th Engineer Battalion, 1st Armored Division	Giessen, Germany
Moreno, Private Reece D.	92d Engineer Battalion, 3d Infantry Division	Fort Stewart, Georgia
Nelson, Private First Class Andrew H.	9th Engineer Battalion, 1st Cavalry Division	Schweinfurt, Germany
Phaneuf II, Staff Sergeant Joseph E.	Headquarters and Headquarters Company, 102d Infantry Brigade	Hartford, Connecticut
Preston, Specialist Aaron L.	9th Engineer Battalion, 1st Cavalry Division	Schweinfurt, Germany
Riekena, Sergeant James D.	Alpha Company, 145th Combat Support Battalion	Post Falls, Idaho
Shannon, Corporal Stephen D.	Charlie Company, 397th Engineer Battalion	Wausau, Wisconsin
Sheppard, Specialist Joshua D.	642d Engineer Support Company, 10th Mountain Division	Fort Drum, New York
Soukenka, Sergeant Richard A.	2d Brigade Special Troops Battalion, 10th Mountain Division	Fort Drum, New York
Volker, Specialist Robert J.	5th Cavalry Regiment, 1st Cavalry Division	Fort Hood, Texas
Werner, Private First Class Raymond M.	Alpha Company, 321st Engineer Battalion	Boise, Idaho
Wright, Sergeant Gregroy A.	1st Engineer Battalion, 1st Infantry Division	Fort Riley, Kansas

Engineer Update

Engineer Dog Handlers Needed! The Engineer Canine Detachment Program continues to grow. Exceptional military occupational specialty (MOS) 21B combat engineers are needed to become dog handlers and work as part of a Specialized Search Dog (SSD) or Mine Detection Dog (MDD) Team. Our Canine Detachments are a major part of the theater commander's counter improvised explosive device (IED) measures. The Engineer Regiment is constantly responding to increased requirements for dog teams in support of Operation Iraqi Freedom and Operation Enduring Freedom commanders. Interested 21Bs in the rank of specialist through staff sergeant must be physically and mentally capable of deploying and working independently for maneuver commanders. Handlers must be mature, articulate, assertive, and self-motivated Soldiers who have no fear of dogs. Initial screening for interested Soldiers will be conducted telephonically. The names of potential candidates will be forwarded to the Human Resources Command Engineer Branch for assignment consideration.

The point of contact is *<richard.villa@us.army.mil>* (573) 596-5497.

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Transition From ARTEP MTPs to CATS. The U.S. Army is in the final phase of transitioning from using the Army Training and Evaluation Program (ARTEP) mission training plans (MTPs) as a collective training tool to using the combined arms training strategy (CATS). A CATS is a unit training strategy which, as an entity, takes the entire training planning process from the cradle to the grave. A CATS is developed from a unit's base table of organization and equipment (TOE) and Department of the Army-approved mission statement. They are designed using the crawl-walk-run training model. Commanders will make the final determination as to which tasks should be trained and at what level the training should begin, since they will know their unit's training status. Included in CATS are the required training resources such as Class III and Class V materials and training aids, devices, simulators, and simulations (TADSS).

The current ARTEP MTPs that are located on the Reimer Digital Library (RDL) are scheduled to be removed from the RDL in February 2007. Once this is complete, all CATS will be located on Army Knowledge Online (AKO) on their own dedicated page. The planned end state is movement of CATS to the Digital Training Management System (DTMS) once it is fully fielded. Additionally, the Collective Training Division of the United States Army Engineer School developed a Web site on the Engineer Portal which will also have links to CATS and files available for download. The following link will take you to the site: *<https://www.mwu.army.mil/portal/eng/index.php>*.

The point of contact at the Engineer School Collective Training Division is *<joseph.toth1@us.army.mil>* or call (573) 563-7821.

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Center for Engineer Lessons Learned (CELL). The United States Army Engineer School CELL needs your help. To keep training, doctrine, and combat developments current and to prepare for the future, it is critical that the school continuously receive relevant engineer observations, insights, and lessons (OIL). The CELL can derive information from a variety of sources: unit after-action reports (AARs); tactics, techniques, and procedures (TTP) used by units in and returning from theater; Soldier observations/submissions to the Engineer School; and requests for information (RFIs). This information is used to conduct doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) gap analyses and to determine solutions. These solutions are distributed to the Engineer Regiment via new doctrine and training products, *Engineer* (The Professional Bulletin of Army Engineers) and other publications, and websites and by answering RFIs. (The Engineer School RFI website provides the Engineer Regiment a reachback capability.) You can help by forwarding any of these materials from your unit's deployment to the CELL. Unclassified information can be sent to *<Doctrine.Engineer@wood.army.mil>*. Classified information can be sent by secure Internet protocol, routed (SIPR) e-mail to *<reginald.snodgrass@us.army.smil.mil>*.

The point of contact is *<reggie.snodgrass@us.army.mil>* or call (573) 563-6121.

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Clear The Way

By Major General William H. McCoy
Commandant, United States Army Engineer School

Jill and I and the entire engineer Family at your home of Fort Leonard Wood extend best wishes and enormous appreciation for the entire Team, to include Soldiers, Families, civilians, and loved ones. It is truly our privilege and pleasure to meet many of you and thank you personally for your service.

In May, many members of our Team had the opportunity to participate in ENFORCE 2007. The St. Louis portion was hosted by the Army Engineer Association, led by COL (R) Jack O'Neil and CSM (R) Julius Nutter. BG (P) Jack Sterling updated the Regiment on engineer support to the War on Terrorism, the transformation of the Regiment, and the Future Force. His brief is posted for your viewing and use on the Engineer School homepage. I appreciate and applaud the efforts of our Councils of Colonels and Command Sergeants Major to identify, discuss, and address the most critical matters related to the future of our Regiment. While we've accomplished much, there is still much work to be done. The vendor displays reinforced the greatest of our total Team, Army, and Nation.

Day 3 began on a beautiful day at Fort Wood with the colors of many of our units and Soldiers of 1st Engineer Brigade representing the Regiment on the field. It was fitting and heartwarming to say the least. Later that morning, we officially dedicated the new Counter Explosive Hazards Center (CEHC) in honor and memory of SFC Paul Ray Smith (MOH winner, 4 April 2003, Baghdad). This beautiful facility enhances our ability to train our Soldiers to defeat the great IED threat. I was honored to participate in the ceremony with Mrs. Birgit Smith, CW2 Bill Smock (INARNG Soldier-Artist who painted and donated the portrait of SFC Smith), and LTC (P) Kent Savre (CEHC Director). The memorial service at the Engineer Memorial Grove was a great tribute and honor to our 231 fallen engineer Soldiers since the beginning of the War on Terrorism. It was our distinct privilege to have the 52d Chief of Engineers, LTG Robert Van Antwerp, join us at Fort Leonard Wood and address our Soldiers and leaders. We ended the day with the Regimental Ball, during which we recognized many of our Active, Reserve, and National Guard Soldiers and leaders. I'd like to again thank everyone for their support to and participation in ENFORCE 2007, *Engineers in Full-Spectrum Operations.* I look forward to next year.

I would like to take a moment to address training of the Regiment. I'm proud of the Soldiers and leaders of the 1st Engineer Brigade who are responsible for training our growing force. They consistently achieve excellence in training, adjusting to emerging trends and TTP, while significantly constrained by resources—most notably personnel. The CEHC is fully engaged in a surge of counter IED training, preparing deploying forces for Iraq and Afghanistan. We are preparing for the move of the Explosive Ordnance Clearance Agent (EOCA) Course from Redstone Arsenal to Fort Leonard Wood beginning this September with the pre-positioning of the lead cadre. Given the continued effects of IEDs on our forces by our enemy and the important changes to the blow-in-place (BIP) policy in Iraq, I ask engineer commanders and leaders to prioritize attendance of our Sappers at the two-week R2C2-Sapper Course and soon to be four-week EOCA Course. These courses are invaluable to protecting the force and defeating this threat.

As is often the case in the Army, summer comes with the transition and farewell of great leaders and Families. Notably, the Maneuver Support Center and the Engineer School farewell two great engineer officers, COL Bobby Nicholson and COL Paul Kelly, and their Families as they retire after nearly six decades of distinguished service to the Army. Our Regiment greatly benefited from their service, and it goes without saying that we will miss them greatly. As we enjoy summer activities, I ask everyone to remain extremely vigilant of the risks and hazards that abound. Already this year, we have lost far too many Soldiers, Army civilians, and Family members to motor vehicle (several without seatbelts), motorcycle, and drowning accidents. I need your help by watching out for each other, using the battle buddy system, employing composite risk management in all that you do, on and off duty, and employing safe practices to protect yourselves and your Families and friends. Proper use of alcohol is a never-ending concern. You are all too important to us, each other, and our Army and Nation to lose you to senseless and preventable accidents. Enjoy your summer, best wishes to you and your Families, and may all the greatest blessings be bestowed upon our Soldiers, civilians, and Families deployed and supporting our Nation at war.

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

ENFORCE 2007

I would like to take this opportunity to welcome LTG Robert Van Antwerp, and his wife Paula, as the 52d Chief of Engineers and thank the command team of the 1st Engineer Brigade for their efforts in making ENFORCE 2007 the success that it was. Under the leadership of COL Iverson and CSM Falaniko, the Soldiers and civilians of the brigade showed their dedication to the mission by working tirelessly throughout the weeks leading up to and during the conference. Thanks also to the Army Engineer Association's COL (R) Jack O'Neil and CSM (R) Julius Nutter for their hours of support throughout the week and to all the vendors for their outstanding displays and great information. Thanks for all you continue to do for our Regiment and for helping make ENFORCE 2007 such a success.

We kicked off ENFORCE in St. Louis with an evening ice breaker, where we were able to rekindle old friendships and meet new people. This year's breakout sessions were a great opportunity for us to discuss important issues about the future transformation of our Regiment. Newly activated units since the last ENFORCE joined the engineer Regimental colors for the Regimental Review ceremony. The new Counter Explosive Hazards Center (CEHC) building was dedicated to Medal of Honor recipient SFC Paul Ray Smith. We took the time to honor our fallen sappers during a solemn memorial ceremony at the Engineer Memorial Grove. This somber event served as a reminder that freedom isn't free. We are forever in their debt, and our thoughts and prayers are with the Families of every Soldier who has made the ultimate sacrifice. We continue to pray for those Soldiers who are deployed in harm's way.

As we progressed throughout the day, we received the State of the Regiment address from LTG Van Antwerp, who spoke with words of wisdom. During this year's Regimental Ball, we announced the gold de Fleury Medal recipient, LTG Elvin R. "Vald" Heiberg III, the 46th Chief of Engineers; the Itschner awards; and the Best Sapper awards. It was good to see all of the Regiment's leaders again, back here at the home of the engineers, engaged in the shaping of our future in support of our transforming Army. I especially want to thank the Engineer Branch Sergeant Major, the Engineer Personnel Proponency Sergeant Major, and the 416th ENCOM Sergeant Major for taking time out of their busy schedules to be a part of the Council of Sergeants Major. Their presence during our conference was historic, and the insights they have on what's important in our Army, its future, and the initiatives being worked were of great value to us all.

One of the aspects of ENFORCE that is extremely important to the future of our Regiment is the interaction that results when we all come together on common ground. This year proved to be very beneficial because we were able to extract recommendations on important issues such as professional and personal development for all Soldiers, MOS consolidation, assignment and training considerations, promotion considerations, and force structure and equipment modernization.

Best Sapper Competition

The Regiment's 3d Annual Best Sapper Competition was held from 30 April - 3 May 2007. There were 13 teams of high-speed and motivated sappers that entered the competition. However, we can only have one 1st place with a runner-up and 3d place, so in 1st place were 1LT Krug and SSG Flores; 2d place went to CPT Evangelista and CPT Winkelmann; and 3d place winners were 1LT Gillman and SGT Paulson. This was the best competition yet! (See article, page 28.) I would like to thank the sponsors that supported our engineer Soldiers. For next year's competition, I encourage all commanders and sergeants major to plan ahead and come to Fort Leonard Wood to show your support to our sappers.

In closing, let me say thanks for your dedicated support to our great Regiment. It is held in high esteem, and that is due largely to all your efforts. We are always on the cutting edge of full-spectrum engineering with the energy of taking care of each other, our Soldiers, and their Families—while giving our total support to mission accomplishment. Be proud of who you are, and always let those around you know that you are a proud member of the best Regiment in our Army. God bless you all.

Essayons!! Engineers Lead the Way!

CSM's Note: I want to publicly thank and say farewell to the CSMs who will leave the Army this year after having served with all their being, mind, heart, and body. Our Regiment will be forever in their debt. Their presence in their units will certainly be missed.

STATE OF THE REGIMENT

ONE TEAM – RELEVANT, READY, RESPONSIVE, RELIABLE

By Mr. Rick Brunk

Lieutenant General Robert L. Van Antwerp became Chief of Engineers and Commander of the United States Army Corps of Engineers on 18 May 2007, taking charge of the nation's leading public engineering agency. His previous assignment was as Commanding General, United States Army Accessions Command and Deputy Commanding General for Initial Military Training at Fort Monroe, Virginia. Other assignments include Commanding General, United States Army Maneuver Support Center and Fort Leonard Wood/ Commandant, United States Army Engineer School; United States Army Corps of Engineers Los Angeles District; the United States Army Division, South Atlantic, Atlanta, Georgia; and the 326th Engineer Battalion, 101st Airborne Division (Air Assault), during Operations Desert Shield and Desert Storm.

Just days after assuming duties as the 52d Chief of Engineers and commander of the United States Army Corps of Engineers, LTG Robert L. Van Antwerp spoke to senior engineer leaders at ENFORCE 2007 at Fort Leonard Wood about the State of the Regiment, focusing more on how to improve for the future than on the Regiment's current state.

"Continuity and change: There will be both," he said, "so get ready for them. We're going to recalibrate this organization. We're going to see if we've got it right. And if we've got it right, we're going to drive on." He introduced two acronyms to explain how that would happen: SIW (share ideas willingly) and SIS (steal ideas shamelessly). He said that if we're willing to share division to division, district to district, training battalion to training battalion, and company to company, we won't have to invent everything ourselves. He said that almost every good idea has already been thought of and that this was one area where we can steal shamelessly.

LTG Van Antwerp talked about working on the *Army Strong* campaign. He said that a New York advertising firm sent some of their personnel to Fort Jackson, South Carolina, to basic training to help develop a new slogan for the Army. For four and a half days, they did everything that the basic trainees did during that time. At the graduation ceremony, they remarked that they thought they were pretty strong when they got there but that now they were *Army Strong*. Thus, the slogan was born. LTG Van Antwerp has taken it a step further by asking "What does *Army Strong* mean to engineers?" The answer—*Army Strong, Engineer Ready*—was depicted in a short video with the following definitions of the motto: [1]

Webster defines *ready*
As being prepared mentally or physically
For some experience or action;
Prepared for immediate use.
But with all due respect to Webster,
There's ready,
And then there's *Engineer Ready*.
It is a physical readiness.
It is an emotional readiness.
It is a readiness of character
And a readiness of purpose.
It is a readiness to do good today
And a readiness to do well tomorrow.
It is a readiness to obey
And a readiness to command.
It is a readiness to build
And a readiness to tear down.
It is a readiness to get yourself over
And a readiness to get over yourself.
There is nothing on this green earth
That is more ready
Than the U.S. Army Corps of Engineers.
Because there is nothing on this green earth
That is more ready
Than the Soldiers and Civilians
Of the U.S. Army Corps of Engineers.
Army Strong, Engineer Ready!

LTG Van Antwerp said that the nearly four months between his nomination for the post and final Congressional confirmation helped prepare him for his new job. "The first thing it did was build a passion in my heart for what we do. I don't think that just liking something inspires. I think you have to love it." The delay also helped him solidify the following top priorities for the Regiment, which are not necessarily listed in order of their importance.

- Support the Global War on Terrorism (GWOT) and expeditionary missions.
- Enhance the quality of support to Soldiers, Civilians, Families, and the public.
- Complete the transformation of the Theater Engineer Commands.
- Effectively prepare for and respond to disasters.
- Enable Gulf Coast recovery.
- Deliver military, civil works, research and development (R&D), and regulatory programs and projects.

In addition, there are three tenets which are inherent in each of the priorities. They are—

- Communicate transparently. "This means that if I'm at risk, you tell me about it. You don't keep that from me, because I have a right to know, whether I'm a citizen, a stakeholder, or whatever."
- Focus on your mission. "You have to think about relationships—the people, the center of gravity—to get the mission done."
- Team with industry. "I'm going to use a different word from 'partnering.' I think we have to *team* with industry," he said, and he used a sports metaphor to compare the relationship between the Regiment and industry. "What is partnering, and what does being on the same team mean? If you had a basketball team, you'd look at every team member, and every team member has to contribute. But what about when you have a project and you're counting on part of that industry team to deliver that project on time. Are they not part of your team? Are they just another partner, or are they really a part of the team? I think they're a part of the team. We have about 35,000 employees in the Corps of Engineers, and there are about 300,000 under contract to us," he said. He explained that the team concept will be important during his tenure as Chief of Engineers.

"The priorities are *what to do*. This is my philosophy of *how to do it*," he said, pointing to the word *T.E.A.M.* on a slide. "If you think about a team, what do you think about? For one thing, you think about teammates. I depend on you, and you depend on me. We've got to do our jobs separately to do it together. In the ultimate game, it's not about any individual. I love it when a player gets up and says, 'I did it for the team.'"

"**T** – stands for *trust*. How are we viewed out there? Do you think they trust us? Are we trusted internally? Are we trusted externally? In one sense, I mean trust in your communications. When we talk about strategic communications, it means that what you say is true. There's a sort of contract in trust, that when you say you're going to do something, you deliver it on time. My gut feeling is that there are a lot of people out there who don't trust us, not like they should. Not for an organization as dependable and incredible as we are. So we've got to work on that trust."

LTG Robert L. Van Antwerp, Chief of Engineers and Commander of the U.S. Army Corps of Engineers, gave the "State of the Regiment" address during ENFORCE 2007.

"**E** – stands for *excellence*. What goes into excellence? It's measured in a lot of different ways. You know it when you see it. It's not an ordinary way of doing things; it's an extraordinary way of doing things. When we do excellent work and they say thanks, we're going to say, 'It's been our pleasure.' Not just 'You're welcome,' but 'It's been our pleasure,' because it is our pleasure to serve."

"**A** – stands for *It's all about peo*ple. When you get to know me well, you'll know that's where it is for me. That's why I'm still in. That's why I want to stay and do this."

"**M** – stands for *motivating*. A lot of it is your personal example. When you get the right talent and they set the right example, it's motivating."

"When you do all these 'team' things, you'll leave a legacy. And don't we want to leave what's right for the next generation? What we're doing today is going to make a difference tomorrow."

LTG Van Antwerp ended by saying, "I'm thrilled to be your Chief of Engineers. I'm honored. It's a privilege. I didn't request it or even aspire to it. But when offered, I was willing, and I'm passionate about doing it—for 4 years or 10 years or whatever. I thank you for what you're doing; I commend you for what you've done. ... I want to be with you when we do what we're going to do. I think we have a bright future. Not only that, we've got the leaders and the people to get it done. So let's go out and do it."

Mr. Brunk is the editor of the Engineer Professional Bulletin. Previously, he edited the Fort Leonard Wood newspaper, Guidon.

Endnote

[1] The *Army Strong, Engineer Ready* video shown during the Chief of Engineers address was put together by Major Dawn Conniff, Headquarters, U.S. Army Corps of Engineers.

Training the Neglected Core of Army Leadership – Troop-Leading Procedures

By Lieutenant Colonel Charles J. Olsen, Major David R. Sierakowski, Major Ronald Holden, and Command Sergeant Major John Laudonio

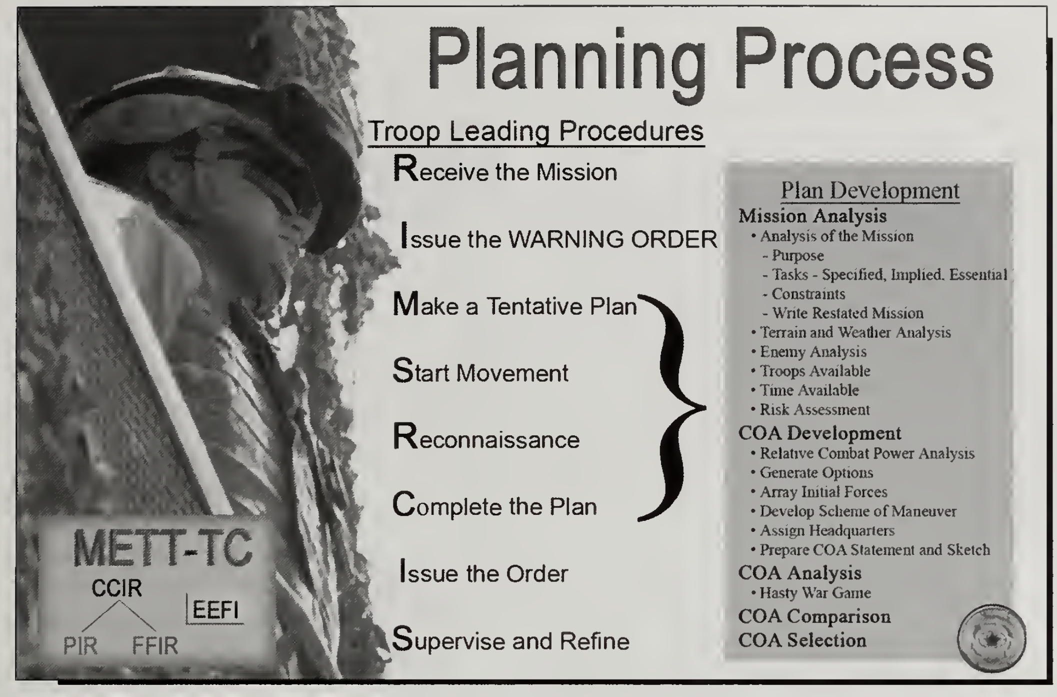
Anyone who has served at a mobilization training center (MTC) has probably observed something similar to the following scenario when working with highly cross-leveled Army National Guard or United States Army Reserve units led by inexperienced commanders and/or key leaders:

- √ *About 48 hours ago, First Lieutenant Smith looked at his training schedule to confirm that his detachment would conduct a combat patrol convoy and improvised explosive device (IED) defeat training, but failed to clarify the intent, standards of training, and exact start time.*
- √ *Two hours prior to commencement of the combat patrol convoy, confusion reigns in the unit, because 20 Soldiers did not receive advance notification of required equipment. Four Soldiers suddenly announce that they have dental appointments.*
- √ *Due to an unannounced state dignitary visit, the commander cancelled yesterday's training meeting that was to finalize the unit tactical standing operating procedure (TACSOP) and determine the best unit crew configuration options.*
- √ *A platoon sergeant suddenly reports two HMMWVs and an M2 non-mission capable, and the supply sergeant has no crew-served weapon (CSW) blank adaptors for the training.*
- √ *The unit arrives on time on Range 29, but at the wrong entrance.*
- √ *The executive officer (XO) worked until 0200 to complete 80 percent of an operations order (OPORD)...by herself.*
- √ *The same XO answers at least 20 "What's going on?" questions that morning.*
- √ *Instead of rehearsing crew drills, a squad leader tells his Soldiers, "You'll find out everything when you get to the lane."*

If the step sequence of these eight shortcomings seems very familiar, congratulate yourself on being one of a minority of military leaders who has memorized and understands troop-leading procedures (TLP). Last year, TLP were cited as a key training focus area for all deploying U.S. units by LTG Russell Honoré, First United States Army commander, in his 20 Absolute Training Rules.[1] TLP get a lot of lip service, but are often considered merely another tool for company-level leaders; the military decision-making process (MDMP) is the related leadership tool for battalions and above.[2] Yet successful, seasoned military leaders at all levels conduct TLP out of habit, keeping their teams informed through warning orders (WARNOs), getting out of the tactical operations center (TOC) to reconnoiter, using the MDMP to complete their plans, etc. TLP are considered *procedures,* and the Army's previous leadership manual (Field Manual [FM] 22-100) cited TLP, but surprisingly and sadly you won't find this word sequence in FM 6-22, the Army's newest leadership manual.[3]

> *"To accelerate the transformation of our training...and develop adaptive, multiskilled leaders, we must achieve full-spectrum capability with full-spectrum training."*
>
> General Peter J. Schoomaker
> Chief of Staff, U.S. Army
> "Transformation of Training"
> (9 May 2006) pp. 1-2

The First Army commander is not among those who have left TLP out of their leadership lexicon. He has stipulated that observer-controller/trainers (OC/Ts) at every MTC will supervise to ensure that no collective training occurs until TLP are done to standard.[4] Observer-trainer-mentors (OTMs) ensure that every mobilizing unit that comes through the 181st Infantry Brigade at Fort McCoy, Wisconsin, receives two days



Planning Process

Troop Leading Procedures

- Receive the Mission
- Issue the WARNING ORDER
- Make a Tentative Plan
- Start Movement
- Reconnaissance
- Complete the Plan
- Issue the Order
- Supervise and Refine

Plan Development

Mission Analysis
- Analysis of the Mission
  - Purpose
  - Tasks - Specified, Implied, Essential
  - Constraints
  - Write Restated Mission
- Terrain and Weather Analysis
- Enemy Analysis
- Troops Available
- Time Available
- Risk Assessment

COA Development
- Relative Combat Power Analysis
- Generate Options
- Array Initial Forces
- Develop Scheme of Maneuver
- Assign Headquarters
- Prepare COA Statement and Sketch

COA Analysis
- Hasty War Game

COA Comparison

COA Selection

Figure 1

of formal, counterinsurgency (COIN)-based TLP and MDMP instruction. The essence of TLP is shown in Figure 1.

This article addresses the critical need for OTMs during National Guard/Reserve postmobilization training, the key components of a successful program, and a typical day for an OTM. If you are returning from a deployment, you may find your talents ideally suited to be an OTM to instill TLP, lessons learned, and leadership principles in this year's deploying leaders during their postmobilization training.[5]

Definitions

Observer-trainer-mentor. You may never have heard of an OTM, which is not surprising since the authors of this article created the acronym. Unlike OC/Ts—who are responsible for controlling and training Soldiers on specific individual or collective tasks or a specific training event (such as urban operations, hand grenade employment, or an S2 section evaluation during an Army Training and Evaluation Program [ARTEP])— OTMs are experienced leaders assigned to mobilizing units for the duration of their predeployment training cycle to provide mentorship and continuity of assessment. They fulfill the role/need of a higher "chain of command" for independent combat support units when none are present at the MTC. OTMs move beyond the "control" duties of OC/Ts and instill sound daily TLP in units and train leaders *how to think* vs. *what to think*, to prepare them for the nonlinear decisions required in a COIN environment. Since the end of Desert Storm, pin-on time to captain has been reduced by more than 25 percent, resulting in less operational experience for company commanders; OTMs share their years of experience with these young commanders.[6] Prior to deployment, OTMs are also responsible for identifying those few leaders who lack the capacity to lead in combat and train their replacements.

Troop-leading procedures. TLP are a sequence of actions that enable the commander or platoon leader to use available time effectively and efficiently in the planning, preparing, executing, and assessing of combat missions; they also assist leaders in making, issuing, and supervising OPORDs. TLP are integrally coupled with the MDMP.[7]

Mobilization 101

MTCs execute required individual and collective Coalition Forces Land Component Command (CFLCC) and United States Army Forces Command (FORSCOM) training to validate units for deployment. For some units, this can exceed 200 tasks.[8] When a unit receives a mobilization order at its home station, commanders are faced with a broad scope of logistics, personnel, Family readiness, and training planning. They are also transitioning and assuming new responsibilities from their handful of "full timer" Active Guard and Reserve staff members.

The unit receives expert guidance from the mobilization assistance team (MAT). In addition, its assigned training support brigade (TSB) provides a unit mobilization assistor (UMA) to work with the unit at home station. The UMA helps the commander understand the mobilization process and tracks administrative and logistical requirements. It is a hectic environment and not a good time or place to learn the basics of team building and neglected TLP. Once the unit arrives at the MTC, UMAs provide the link between the unit and the MAT to address the unit's logistical and administrative needs and to validate that every Soldier achieves the standard in required individual and collective tasks.[9] Training support battalions (TSBns) provide the OC/Ts to train each of the major training lanes. OTMs complete the picture.

OTM Evolution

In February 2006, the commander of 2d Brigade, 85th Division (now 181st Infantry Brigade, First Army Division East), and the Fort McCoy installation commander prepared for the influx of separate combat support units and Soldiers and Airmen who would be conducting mobilization readiness training at Fort McCoy in 2006. During a training visit to Camp Shelby, Mississippi earlier that year, the 2d Brigade commander observed how the commander of 4th Battalion, 87th Division, assigned battalion commanders and command sergeants major as "combat counterparts" to train and advise the battalion-level leaders of the 1-34th Brigade Combat Team (BCT) on a daily basis.[10] Upon returning to Fort McCoy, the 2d Brigade commander formed a team of field grade officers and senior noncommissioned officers (NCOs) from the 1st Brigade, 85th Division (Training Support), augmented later by ten recently redeployed Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF) Operation Warrior Trainer (OWT) leaders to train and mentor down to the company level. He added a fourth tier of training support to his existing team concept (see Figure 2):

- MAT/mobilization unit inprocessing center (MUIC) (installation resources, training synchronization, and unit validation)
- TSBns (training lane execution and ARTEPs)
- 181st Infantry Brigade staff (coordinate functional, specialty, and new equipment training).
- The fourth tier of training support would be OTMs who would train leaders in areas such as COIN MDMP, TLP, maintenance management, Uniform Code of Military Justice (UCMJ), time management, why we fight, TACSOP/mission-essential task list (METL) development, and fitness programs.

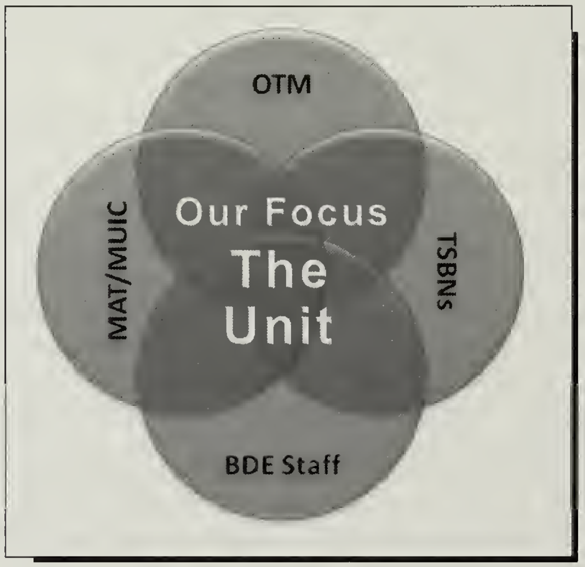


Figure 2

OTM Need

BCTs bring their own chain of command for their Soldiers. The missing piece at many MTCs is a chain of influence between the TSB/installation commanders and non-BCT mobilized units. OTM field grade officers and senior NCOs provide the necessary support. In the case of Fort McCoy in 2006, OTMs represented a "higher echelon of command" between separate unit commanders with different needs and issues. OTMs gave the TSB commander and installation commander the eyes and muscle to train and enforce standards.

Accelerated deployment cycles and personnel turnover often lead to increased personnel cross-leveling, which can make it difficult for a commander to build and lead a cohesive unit during the train-up cycle.[11] This is especially true if it is a combat support unit that is not organic to a BCT. Junior commanders in these units are often accustomed to operating relatively independently at their armories without battalion/brigade staff nearby. In the limited time available during weekend battle training assemblies, TLP often take a back seat to the complex individual military occupational specialty (MOS) and specialized schools and training needed in postal, medical, engineer, logistics, signal, and finance units.

National Guard and Reserve Soldiers bring a valuable skill set dimension to COIN operations that the Active Army may not. Civilian skills are often aligned with, and augment, military duties. Moreover, civilian professions often provide a useful common ground with international military or agency counterparts in-theater. The authors of this article are all mobilized reservists and know the value that reservists bring to the fight. However, the mathematical reality of our system is that even the most dedicated reservists usually do not possess the years of day-to-day military experiences that their Active Army peers have. It is a challenge for some leaders to transition from a battle training assembly leader, where informal interactions among all ranks are common, to an Active Army leader who faces tough personnel decisions on a daily basis.

OTMs remind leaders that their Soldiers need leadership vs. "likership." In addition, many leaders need to let go of linear doctrine and learn new COIN doctrine and terms. OTMs get them up to speed fast on doctrinal changes (to include an acronym primer tool) and expose them to cutting edge knowledge management centers such as the Battle Command Knowledge System (BCKS) and the Center for Army Lessons Learned (CALL). We include leader-based practical exercises in escalation of forces (EOF), cultural negotiations, contemporary leadership challenges, and a full-spectrum staff (and modified company-level) MDMP involving all six lines of effort (LOE) depicted in Figure 3.

If units arriving at MTC McCoy have a low level of physical fitness and weight-control readiness, the OTMs provide nutrition and fitness guidance for the leaders to conduct challenging, safe, battle-focused physical training (PT). Units often increase their average Army Physical Fitness Test (APFT) scores considerably after implementing the OTM frequency, intensity, type, and time (FITT) exercise program and the First Army tactical foot march requirements.

Deploying National Guard and Reserve officers and senior NCOs at Fort McCoy should know the 8 steps of TLP prior to leader training. (Less-than-successful Reserve unit training experiences primarily stem from lack of TLP knowledge.) In addition, basic command functions that may require OTM training at the MTC include conducting a formal maintenance precombat inspection (PCI), administering an Article 15 hearing, reading a Materiel Condition Status Report, conducting an effective training meeting, and establishing an effective and responsive Prevention of Sexual Harassment (POSH)/Equal Opportunity (EO) program. Since dedicated citizen-Soldiers don't have the benefit of experiencing these events 365 days a year like their Active Army counterparts, OTMs fill these training gaps by going beyond validation requirements—they teach leadership skills for life.

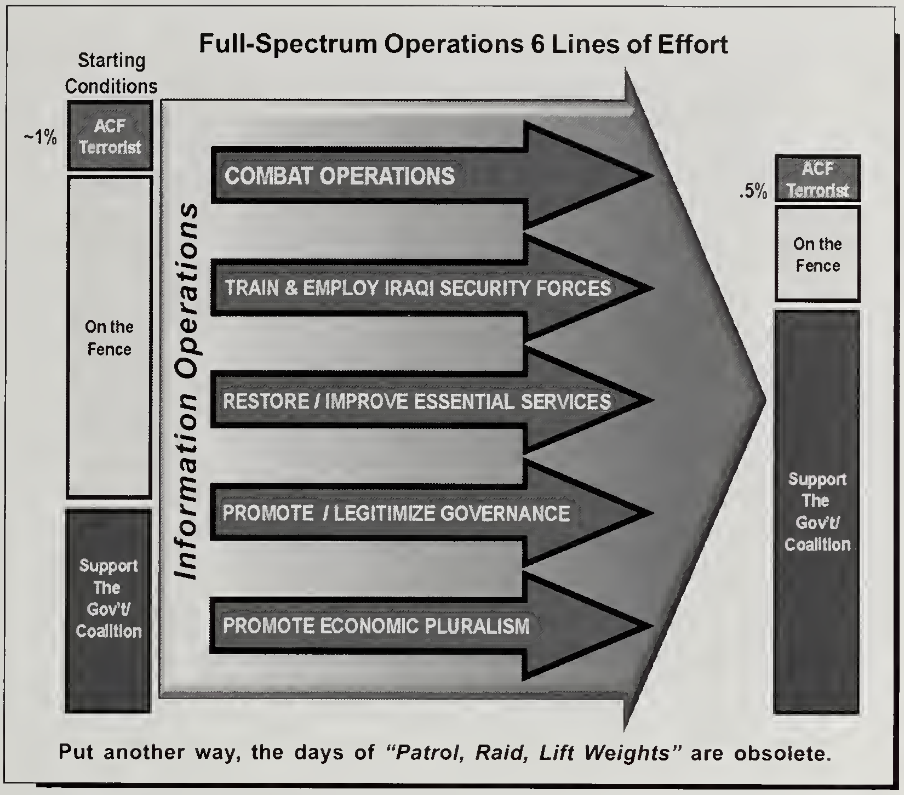

Full-Spectrum Operations 6 Lines of Effort
Starting Conditions
~1%
ACF Terrorist
On the Fence
Support The Gov't/ Coalition
Information Operations
COMBAT OPERATIONS
TRAIN & EMPLOY IRAQI SECURITY FORCES
RESTORE / IMPROVE ESSENTIAL SERVICES
PROMOTE / LEGITIMIZE GOVERNANCE
PROMOTE ECONOMIC PLURALISM
.5%
ACF Terrorist
On the Fence
Support The Gov't/ Coalition
Put another way, the days of *"Patrol, Raid, Lift Weights"* are obsolete.

Figure 3

"We must continually think about the junior commissioned or noncommissioned officer who has to make a huge decision, often with life or death consequences, in the blink of an eye. There is no substitute for flexible, adaptive leadership."— General David H. Petraeus[12]

Launching the OTM Full-Spectrum Team

In March 2006, the OTM officer in charge (OIC) visited the Combined Arms Center (CAC) for a week to learn and implement the latest COIN and full-spectrum leadership doctrine. It was here that the CAC commander, Lieutenant General (now General) David H. Petraeus, instilled the *Engine of Change* concept to train leaders in full-spectrum operations along the six lines of effort shown in Figure 3 and to learn the lessons from an article called "Winning the Peace – the Requirement for Full-Spectrum Operations."[13] The CAC team advocated training leaders *how to think* vs. *what to think.*

The OTM OIC concluded that OC/Ts are imperative during training events but that OC/T implies "controlling" leaders. Upon completion of "scheduled training" for the day, the OC/T approach is not desirable when leaders take charge of their units and TLP for the next day are just beginning. In discussing leadership, the word "mentoring" is referred to in 25 paragraphs of FM 6-22; OTMs would train and mentor leaders to guide them and let them learn on their own through experience. Certainly a control (or higher command) function would be an option, but only when critical questioning and suggestions failed. The OTM OIC promised the CAC leaders that "check-the-block" and/or "turn-key" training would not be an option for the OTM full-spectrum team (OTM FST) in training leaders to win.

Napoleon Bonaparte once said, *"You can ask me for anything you like, except time."*[14] This applies to good TLP as well as to the fact that the OTM FST had less than a month to prepare before the first units arrived. Within 3 weeks, the basic OTM processes had been developed, a 44-topic leader training program (LTP) had been constructed, the OTM team concept for mobilizing units had been created, and the OTM unit logo had been designed.[15] On 14 March 2006, the OTM FST began training its first unit. From after-action reports (AARs), unit exit surveys, and shared best practices, the OTMs learned how to improve for every mobilizing unit thereafter.[16]

The OTM Mission

The 181st Infantry Brigade OTM FST ensures that every unit deploying into theater has competent and confident officers and NCOs who know how to lead their Soldiers and win in a COIN environment. The OTM FST executes four key training functions:

- A full-spectrum LTP to train required FORSCOM leader tasks.
- A professional development program (PDP) to train key leader tasks outside of FORSCOM requirements.

OTM Leader Training Program

Specified Tasks

(Required FORSCOM Change 8 Leader Training)

3A - COE/Full-Spectrum Operations/Why We Fight
3C - Perform Cultural Negotiations
3E - Lethal/Nonlethal Operations
3I - Risk Management
3L - TACSOP Development
3O - Fitness/Combat Stress
3S - COIN Fundamentals
3U - PCC/PCI
3Z - IPB
4D1 - TLP/OPORDs
4D2 - C2 and MDMP
4D2 - Information Operations
4D2 - EBO (p61)
5B5 - Establish Company TOC

Brigade Commander Specified Tasks

1. TLP
2. OPORDs
3. Implement EO/POSH Program
4. AR 15-6/UCMJ Overview
5. Conduct AARs
6. Supply/Maintenance Management
7. Role of Commander/First Sergeant
8. Tactical Communications
9. Leader OPSEC Considerations
10. Rear Detachment Commander/FRG
11. RSOI OPLAN

Figure 4

- Ongoing coaching and mentorship via embedded OTM teams to build unit TLP and cohesion.
- Unit leadership assessments using the "Big 10" process for the 181st Infantry Brigade commander.

Leader Training Program. Within two weeks of unit arrival, the leadership training team conducts the four-day LTP for officers and NCOs in the grade of E8 and above. Concurrently, NCOs in the grade of E4(P) to E7 receive two days of the NCO Leader Training Program (NCOLTP) (taught 100 percent by NCOs!). The LTP covers 17 core leadership topics, and the NCOLTP covers 9 core topics. Figure 4 shows 14 required CFLCC leader training topics along with 11 others directed by the 181st Infantry Brigade commander. The training is heavy on practical exercises and OPORD creation. The OTM has an AAR from every unit, and so far, feedback from units has been extremely positive. Among the most popular blocks of training are "Why We Fight" and "Killology," which address the "why" of OIF/OEF in a frank manner that is lacking in most training and media channels. Figure 5 depicts the full training list offered by the OTM FST.

Professional Development Program. The 21 topics in the PDP (Figure 5) are "electives" that most unit leaders need refresher training in. These hands-on topics are trained during the last day of the LTP, as selected by each unit commander, and trained at the unit during rare "open" unit training time periods. Generally, once a unit tried one PDP course, other PDPs would follow. The commander of the 395th Finance Battalion scheduled his leaders for virtually every PDP during his unit training time.[17]

Team Program. A field grade officer and senior NCO are assigned to OTM up to three mobilizing units for the duration of a unit's predeployment training cycle. We prefer that OTMs cover multiple units, since we believe that a "24/7" presence stifles unit leader growth and their ability to take charge.[18] FM 6-22 states that the Army relies on "mentorship" as a leader development system that compresses and accelerates development of professional expertise, maturity, and conceptual and team-building skills.[19] The short mobilization cycle is compressed to say the least!

Figure 6, page 12, depicts the 20 primary duties of an OTM team with a unit. Being an effective OTM starts with training and enforcing the First Army commander's 20 Absolute Training Rules which specify, among other things, that units will execute TLP with daily precombat checks (PCCs), risk assessments, and OPORDs. They also engage in critical questioning, coaching, and sharing of their recent OIF/OEF experience. OTMs also share more than 54 leader tools ranging from PCC/PCI checklists to leader book inserts. One example in our "OTM Tool Kit" is the checklist of subjects to cover during a relief-in-place (RIP)/transfer-of-authority (TOA) video-teleconference (VTC) (Figure 7,page 13).

Big 10 Assessment Program. Every 48 hours, the OTM team compiles a unit leadership assessment, known as the "Big 10" evaluation, to assess and track unit leadership progress. OTMs counsel unit leaders and the results are briefed to the TSB commander at the weekly "Eagles Call" briefs. Commanders sequentially brief status and improvement plans and learn from (and amidst) their peers in a heightened "command and staff" environment. The first five of the Big 10 criteria are derived from TLP, while the last five are more specific to unit cohesion, safety, and fitness.[20] Units are rated from 1 to 5 with "1" being the lowest. A "4" indicates that the unit is fully proficient in the tasks. A "5" indicates that subordinate leaders are also fully proficient, and the unit executes above standard in these areas even in the absence of the commander and noncommissioned officer in charge (NCOIC). The unit progress is tracked and the unit is classified *green, amber,* or *red* accordingly. Figure 8, page 14, depicts an example of a Big 10 Progress Track and Figure 9, page 14, shows a sample of a Big 10 Daily Assessment.[21]

TLP Notes, Quotes, and Comments

Receive the mission. Too often, leaders do not receive or clearly understand all five "Ws." Insist on it, particularly the "Why," which helps clarify effects and commander's intent. Get the desired end state.

Issue a Warning Order. How many AARs in the history of the Army have started with "We need to communicate better." Well, it starts here. Don't wait until you have all the facts—get word out to your Soldiers so they can get moving on steps 4 and 8. One unit posted signs all over its TOC that read, "Who else needs to know!"

Sample OTM Leadership Team – "Full-Spectrum" Training Program

Leadership Training Program (LTP) for E8 and Up	Battalion	Company/Detachment
1. LTP Introduction	X	X
2. OTM Overview/OIF Theater Update (1.0 hr)	X	X
3. Why We Fight/Killology (1.5 hr)	X	X
4. OPORDs/Problem Solving/Leadership Tools (2.0 hr)	X	X
5. Troop-Leading Procedures (3.5 hr)	X	
6. COIN Military Decision-Making Process (4.0 hr)	X	
7. Award/Officer Efficiency Report (OER)/NCO Efficiency Report NCOER) Updates (1.0 hr)	X	X
8. Casualty Administration and Reporting Procedures (1.0 hr)	X	X
9. Command Philosophy/Developmental Counseling (1.0 hr)	X	X
10. Article 15-6/EO/POSH Leader Issues (1.5)	X	X
11. Implementing a Fitness/Nutrition Program (1.5 hr)	X	X
12. Contemporary Operating Environment (COE)/FM 3.0 new 2006/ FM 7.1/Terms/Effects-Based Operations (EBO) (1.0 hr)	X	X
13. COIN/Full-Spectrum Operations (6 lines) (1.5 hr)	X	X
14. Intelligence Preparation of the Battlefield (1.0 hr)	X	X
15. Conducting Training Meetings (1.0 hr)	X	
16. Conducting an AAR (1.0 hr)	X	X
17. Cultural Negotiations for Leaders (1.5 hr)	X	X
18. EOF, IED Defeat Basics, and OIF Operations Q&A (2.0 hr)	X	X
19. Safety – Risk Management and Assessments (1.0 hr)	X	X
20. SOP and METL Development (1.0 hr)	X	X
21. Maintenance/Supply Management for Leaders (1.0 hr)	X	X

Professional Development Training (PDT) – Additional Optional Leader Training	Battalion	Company/Detachment
1. Operational Terms, Graphics, and Symbols (1.5 hr)	X	X
2. Role of the Commander/XO/1SG/PSG (1.0 hr)	X	
3. Developing a Command Philosophy and Vision	X	X
4. Microsoft Office Techniques and Tips (1.0 hr)	X	X
5. Weapons of Mass Destruction (WMD)/Bioterrorism Primer (1.5 hr)	X	X
6. Establishing a Company TOC (1.0 hr)	X	
7. Financial Readiness for Leaders (1.0 hr)	X	X
8. Army Command and Control (C2) Digital Systems (1.0 hr)	X	X
9. Combat Support Overview (1.0 hr)		X
10. Traditional Customs and Courtesies of the Service (1.0 hr)	X	X
11. Tactical Communications Techniques and Joint Network Node (JNN) (1.0 hr)	X	X
12. Motivating Soldiers (1.0 hr)	X	X
13. IED Defeat MDMP/Earthmoving Fundamentals (2.0 hr)	X	X
14. Joint Operations Overview	X	
15. Blue Force Tracker	X	X
16. Language Lab	X	X
17. "Why We Fight" Movie Series (History Channel)	X	X
18. JAG Q&A 2-6445 (ROE, EOF, Article 15-6, SH, EO, Misc.)	X	X

NCO Leader Training Program (NCOLTP)

1. Conducting PCI/PCC (2.0 hr)
2. Implementing a PT Program (1.5 hr)
3. Risk Assessment (1.0 hr)
4. CASEVAC/Medical Evacuation (MEDEVAC) for Leaders (1.0 hr)
5. Section/Squad TLP/MDMP/OPORDs (3.5 hr)
6. Conducting Training and AAR to Standard (1.0 hr)
7. NCOERS/Counseling Subordinates, and Leader Books (2.0 hr)
8. Conducting a Platoon Training Meeting (1.0 hr)
9. EOF/Counter RCIED (Remote-Control Improvised Explosive Device) Electronic Warfare (CREW)/OIF Operations Q&A (2.0 hrs)

Figure 5

Make a Tentative Plan. This is the Army's 7-step problem-solving process, starting with "Determine the best way to (insert mission here)." Experienced NCOs provide some great courses of action—if they are involved and are asked. Get solid facts and intelligence preparation of the battlefield (IPB) and use pattern analysis to help with assumptions. This step is where leaders step away from their "checklists on what to think" and develop courses of action that incorporate lethal and nonlethal means. As one COIN expert stated, "Counterinsurgency requires an excruciatingly fine calibration of lethal force. Not enough of it means you will cede the offensive to your enemy, yet too much means you will alienate the noncombatants whose support you need."[22]

Start Necessary Movement. Preventive maintenance checks and services (PMCS), risk assessments, and PCC are part of movement, and every first-line supervisor needs to conduct them. Getting smart on something falls in this category as well. If you are a Level I medical unit and there may be some Level II operations involved, read the FMs to get smart fast.

Reconnoiter. Officers must get out in their area of operation to know what's going on externally. Let NCOs run the unit. Human intelligence is key in COIN reconnaissance. Management is about the present—the "What" and "How." Leadership is about the future—the "Why," "When," and "Where."[23] Get out and lead.

Sample of OTM Team Duties and Unit Mentorship Training Program

SAMPLE

1. Establish presence at key meetings and act as a "sounding board" and mentor for leaders.
2. Train and evaluate TLP: PCC/PCI, MDMP, risk, OPORDs.
3. Assist unit with battle-focused PT program: three ruck marches and two APFTs.
4. Mentor leaders and act as higher command as required (simulated higher chain) to enhance readiness.
5. Share tools and best practices. Provide OTM CD set of all LTP topics and latest TTP and graphic training aids (GTAs).
6. Complete 4-page checklist and initial assessment with commander (SARC, UMO, rear detachment).
7. Help develop unit RSOI OPORD.
8. Assist with building leadership teams, Individual Ready Reserve (IRR) Soldier integration, and command climate.
9. Enforce maintenance PCI, weapons discipline, and safety.
10. Share CSW PCI and individual weapons qualification (IWQ) PMI improvement technique.
11. Train unit in home station multipliers (rear detachment, HTN, Family Readiness Group (FRG), newsletter).
12. Help create FRG video presentation of your unit's training.
13. Assist with revised TACSOP/METL implementation.
14. Identify training issues with commanders 96 hours out; provide UTT Professional Training.
15. Help facilitate ongoing contact with parent and RIP/TOA units (e-mail and VTC).
16. Be the link between your unit and brigade commander (the UA to the MAT is your link to installation).
17. Conduct weekly AARs for the brigade command sergeant major to identify MTC issues.
18. Assess unit leadership/training progress 3 times a week via Big 10 Evaluations.
19. Brief weekly Big 10 status to brigade commander; address leadership progress/ issues.
20. Have unit assess effectiveness of OTM program through unit closeout survey.

Figure 6

Complete the Plan. This does not mean sending out 20 e-mail messages helter-skelter. The Army has a knowledge management tool to transform information into a concise, usable, value-added product—it's called an OPORD, and good units use it consistently.

- Don't—
  - Create a book; use graphics vs. words for your scheme of maneuver.
  - Include TACSOP items in your OPORD; that information is already known.
  - Regurgitate the higher order. Omit fluff and anything not related to your area of operation.
- Do—
  - Give your subordinate elements their own individual mission statements in the Concept of Operations-Maneuver paragraph (3.a.1).[24]
  - Include a timeline and phases.
  - Address all six full-spectrum lines of effort.
  - Nail down implied tasks in tasks to maneuver units (pin the rose on one element) or coordinating instructions (most/all elements).
  - Involve the XO, first sergeant, and supply sergeant in Paragraph 4.

Issue the Order. This means verbally, at a battle update briefing (BUB), or via a command post of the future (CPOF) icon. Have different people brief it. Use visuals and use the brief-back technique. Invite support personnel.

Supervise/Rehearse

- PCI are leader responsibilities to spot-check PCC.
- Don't just visually inspect; ask questions concerning each Soldier mission, TACSOP, etc., to check mental readiness and confirm information flow.
- Ask hypothetical questions requiring thought (for example, execute a casualty evacuation [CASEVAC], intelligence spot report, or rules of engagement [ROE] decision).
- Mix different *conditions* into rehearsals. The task and standards may stay the same, but vary the conditions (for example, presence of civilians on the battlefield [COB], media, and/or Iraqi Security Force [ISF]).

Sample of OTM Subjects for Mobilizing Unit to Cover With RIP/TOA Unit

Commander Subjects:

1. Organizational chart/contact information for military, nongovernment organizations (NGOs), ISF, mayors, etc.
2. Mission-specific requirements/trends/TTP/local EOF policy.
3. Verbatim copy of unit's mission (written at the battalion-level or higher).
4. Task organization. How did their unit change, and what caused the change?
5. Mistakes made in the first 60 days. How did your unit take casualties?
6. Most dangerous enemy course of action for mission/CSS scenario.
7. Past Article 15-6 investigations (point of contact [POC] for legal/UCMJ actions, past and pending).
8. Welcome packet, including map and POCs for the FOB you are going to.
9. Most common 25 – 50 Arabic phrases (with correct dialect) used in your job.
10. Top 5 recommendations of things to do more of during UTT.

NCOIC Subjects:

1. RIP/TOA ceremony setup.
2. APFT site – previous trends and recommendations.
3. Medical support – POC list for previously used facilities.
4. Leave and pass procedures; forms required; Red Cross message chain of events.
5. Housing issues/mess facilities/morale, welfare, and recreation (MWR) facilities/church services.
6. Memorial service set-up/commo black-out procedures.
7. Maintenance requirements/additional assets available.
8. Finance support (usually home state offers best help).
9. Promotions, reenlistments, and schools in-theater.
10. Uniform, safety, Army warrior training (AWT) (formerly weapons tactics trainer [WTT] and common task testing [CTT]) policies.

Staff Subjects:

1. Graphic layout of the TOC – try to mirror conditions during your ARTEP.
2. Higher locations and POCs for direct support (DS)/general support (GS) maintenance, personnel actions, and logistics.
3. POC for maintenance assets, such as transportation management plan (TMP) NODs, weapons, BFT, Warlock, ASIPS.
4. Container express (military shipping container) (CONEX) movement timeline, in and out, and POC for customs officials.
5. Key schools and training to be completed prior to arrival.
6. Required and recommended training while in-theater or reception, staging, onward-movement, and integration (RSOI).
7. Computer access and tech support availability, commo fill procedures weekly/time of key change/who provides fill.
8. Personal and vehicle tracking procedures, FOB Base Defense Plan, and POCs.
9. SIR procedure and information flow.
10. Host nation support provided.

SAMPLE

Figure 7

A Day as an OTM

What might a typical day look like for an OTM team assigned to cover three units during peak cycle?

0600 – Meet Unit X leaders to ensure that they have completed a proper risk assessment with the latest hazards and controls for the day's training. Spot-check equipment and Soldiers preparing to conduct a 5-mile road march; on this day, only four out of six know the top risks and countermeasures, and 20 percent fail to meet the proper uniform standard. The chain of command, not the OTM, corrects the faults, and the unit makes their SP.

0700 – Meet the Unit Z leader conducting PT, check the Soldiers again, and coach them on fitness techniques. Stop unit training after noticing that they didn't take enough time for some of the Soldiers in their unit to stretch. Ensure that weapons are 100 percent integrated into battle-focused PT training.

0745 – Meet Unit Y leaders after combatives training for the same PCC/PCI purpose. Listen to and advise the unit commander about a tough personnel decision being considered.

0900 – Attend the mobilization synchronization meeting (sync meeting) with the UMAs assigned to each unit. Work with our OTM MAT liaison officer to ensure that training for the next week is properly scheduled for each of their units.

1100 – Meet Unit Y at urban operations training and help share some TTP on training Soldiers on some TTP learned in Iraq. Ensure that the NCOs check to see if their Soldiers are properly clearing their M4 weapons at a clearing barrel.

1200 – The OTM officer shares a meal, ready to eat (MRE) with the Unit X commander and explains how to complete an Article 15-6 investigation concerning a blank negligent discharge incident. Query the commander on plans for Soldier and unit corrective training and pin down the commander on when he personally will address the entire unit on the severity

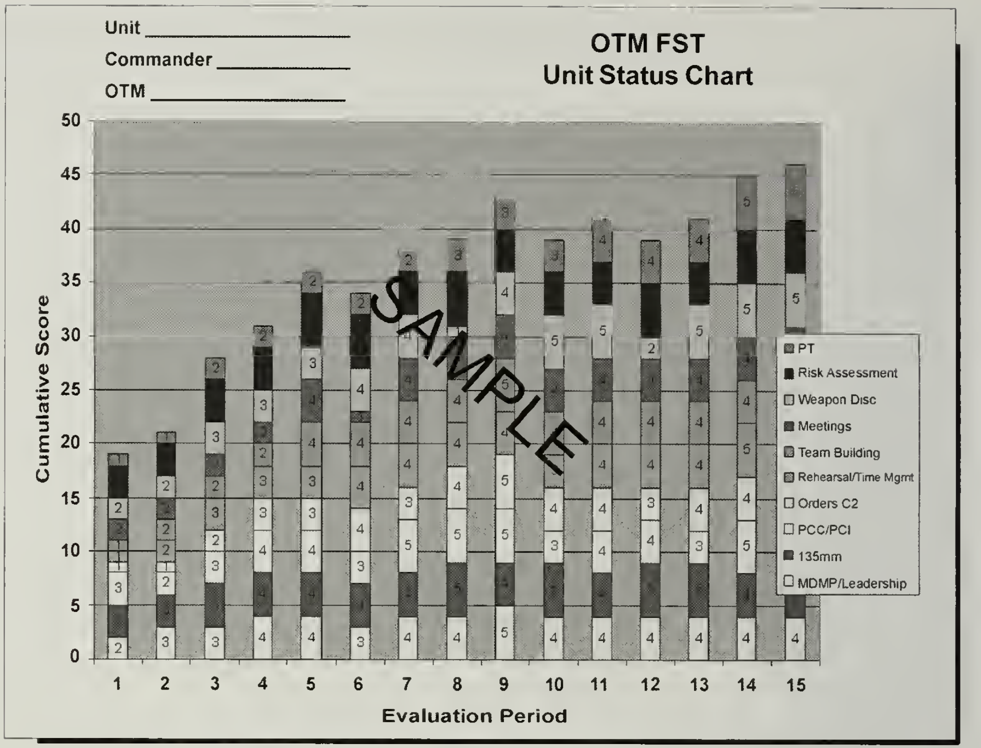


Figure 8

of this kind of incident. Discuss other issues with him that are "keeping him up at night."

1300 – The OTM NCO heads over to the NCOLTP as an instructor to train 60 NCOs from three different units in leader CASEVAC procedures and how to write an OPORD that focuses on getting leaders to identify implied, and not just specified, tasks. Finish with a hands-on practical exercise in the forward operating base (FOB).

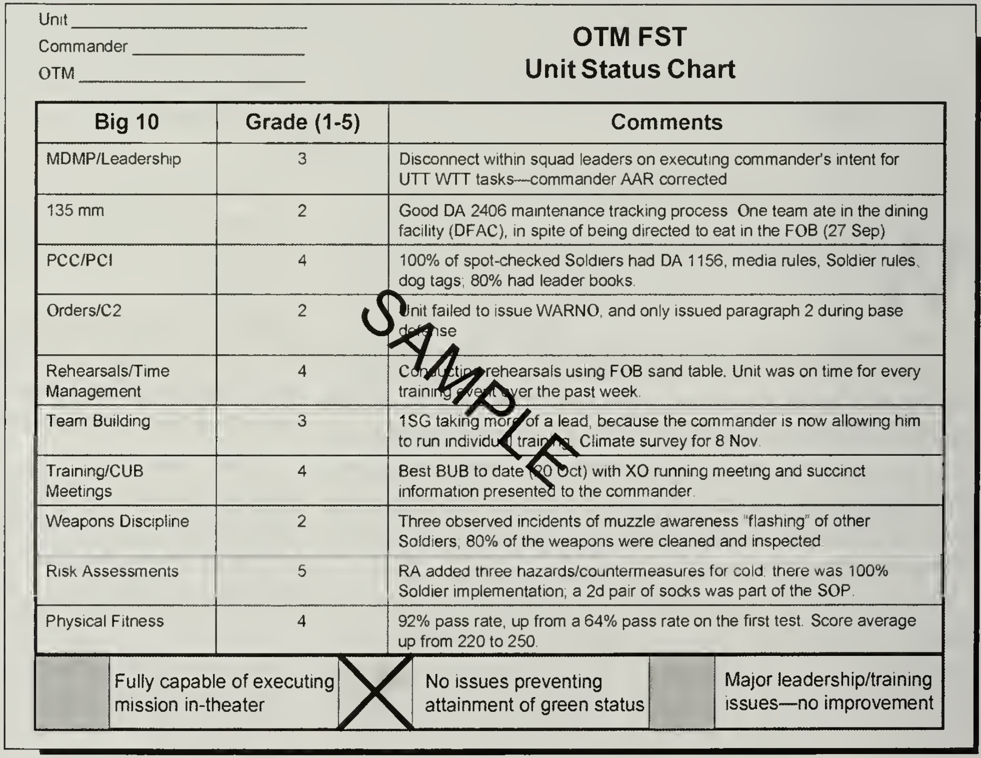
1300 – The OTM officer reports as the assistant instructor at LTP for teaching junior officers the roles and responsibilities of an NCO and coaching them on counseling procedures. He gives two real-life OEF examples that he faced, which generates a 20-minute discussion on alternate courses of action.

1430 – Document and complete all three "Big 10" evaluations and stop by the OTM TOC to update the section OIC on the leadership status of units and get further guidance. Lieutenant colonel OTMs work primarily with battalions and staffs, but add support to their five OTM teams as needed.

1600 – Attend brigade commander's weekly "Eagles Call" meeting for two of his commanders. Mentor the Unit Z commander prior to the meeting on his "Big 10" evaluation, obtain his improvement plan, and rehearse his briefing. Meet afterwards with the Unit X commander and first sergeant to review their performance and discuss how to improve their military briefing style.

1730 – Go back to one or all of the units to conduct an AAR of training for the week. Hear the Unit X OPORD brief at their BUB; interject some brief-back questions to break the silence at the end.

1900 – Attend a unit training meeting and share observations with unit leaders. OTMs are included in the unit BUB agenda right before the NCOIC and commander. The OTM conducts the biweekly 15 minutes of officer professional development (OPD)/NCO professional development (NCOPD) for the unit. Today's topic is "Improving Family Readiness Group Operations" and sharing the Top 10 questions to ask at tomorrow's VTC with their RIP/TOA unit. Praise the 1st Platoon leader for his conduct of realistic EOF rehearsals.



Unit ____________________
Commander ____________________
OTM ____________________

OTM FST
Unit Status Chart

Big 10	Grade (1-5)	Comments
MDMP/Leadership	3	Disconnect within squad leaders on executing commander's intent for UTT WTT tasks—commander AAR corrected
135 mm	2	Good DA 2406 maintenance tracking process One team ate in the dining facility (DFAC), in spite of being directed to eat in the FOB (27 Sep)
PCC/PCI	4	100% of spot-checked Soldiers had DA 1156, media rules, Soldier rules, dog tags; 80% had leader books.
Orders/C2	2	Unit failed to issue WARNO, and only issued paragraph 2 during base defense
Rehearsals/Time Management	4	Conducting rehearsals using FOB sand table. Unit was on time for every training event over the past week.
Team Building	3	1SG taking more of a lead, because the commander is now allowing him to run individual training. Climate survey for 8 Nov.
Training/CUB Meetings	4	Best BUB to date (20 Oct) with XO running meeting and succinct information presented to the commander.
Weapons Discipline	2	Three observed incidents of muzzle awareness "flashing" of other Soldiers; 80% of the weapons were cleaned and inspected.
Risk Assessments	5	RA added three hazards/countermeasures for cold. there was 100% Soldier implementation; a 2d pair of socks was part of the SOP.
Physical Fitness	4	92% pass rate, up from a 64% pass rate on the first test. Score average up from 220 to 250.

▨	Fully capable of executing mission in-theater	☒	No issues preventing attainment of green status	▨	Major leadership/training issues—no improvement

Figure 9

2000 – Grade and prepare findings for the Unit Y Command Climate Survey that it initiated last week. One of the platoon leaders excels at automation but does not appear to have the skill set to lead Soldiers effectively. He has not improved with mentoring, and the survey bears out this observation. Begin preparing a draft letter of recommendation for the brigade commander to reassign him to a staff job.

2100 – Check e-mail, and check out a route clearance article as requested by a platoon sergeant on the BCKS at *<https://bcks.army.mil>*. Conduct personal PCI prepared for the next day, and do everything possible to help Soldiers survive and win in a full-spectrum COIN environment.

Conclusion

The 181st Infantry Brigade OTM LTP was reviewed by the First Army commander in the summer of 2006. He designated the OTM FST to mail disk copies of the OTM TACSOP and training presentations/practical exercises to every mobilization station in the United States. Short of deploying to win the War on Terrorism, there may not be a more important mission than training Soldiers to win in a full-spectrum environment. OTMs are always enforcing theater immersion by enforcing and sharing the words of deployed leaders like the NCOIC of the deployed Brigade Support Battalion of the 1-34th Brigade Combat Team, who wrote: *"Keep telling your Soldiers out there that TLP, PCC, PCI, and wearing all of their protective gear is imperative for their survival. We have had so many Soldiers walk away from their ruined vehicles with nothing more than an exciting story, due to their safety equipment. It is heavy and uncomfortable but sure beats dying."*[25]

We will, sergeant major, and we will "Train to Win."

Lieutenant Colonel Olsen is the director of the 181st Infantry Brigade OTM Leadership Training Program that trained more than 2,600 deploying leaders at Fort McCoy, Wisconsin, in 2006. He has served in 13 different countries as a signal officer and foreign area officer (FAO) during 15 years of active service and 5 years of Reserve and National Guard service. He is a marketing manager for Ford Motor Company with an MBA from the University of Wisconsin.

Major Sierakowski is the primary instructor for the OTM Leadership Training Program. He is a signal officer and Opposing Force (OPFOR) subject matter expert with more than 21 years of National Guard and Reserve experience, to include membership on the Army National Guard Biathlon Team. He works as a civil engineer for Ciorba Group, Inc., in Illinois.

Major Holden was the executive officer of the OTM Leader Training Program for most of 2006. He is an air defense artillery officer with more than 23 years of service. He served as a senior MiTT Leader during OIF II/OIF III from 2004-05.

Sergeant Major Laudonio is the NCOIC of the Mobilization Assistance Team at Fort McCoy, Wisconsin. He has served more than 30 years in the Army and has completed four OIF/OEF tours, including Iraq; Afghanistan; Guantanamo Bay, Cuba; and Eastern Europe. His most recent experience in Iraq was with a transportation company, which logged more than one million miles driving throughout Iraq.

Endnotes

[1] Major General Russel L Honoré, First Army OC/T Leaderbook, Rules #5 and #6, 30 October 2006.

[2] FM 22-100, *Army Leadership*, 31 August 1999, paragraph 2-114. During tactical operations, decision making and planning are enhanced by two methodologies: the MDMP and the TLP. Battalion and higher echelons follow the MDMP. Company and lower echelons follow the TLP.

[3] FM 6-22, *Army Leadership (Competent, Confident, and Agile)* dated October 2006. Many Army publications are not lacking in training TLP. For those who want to dig deep into TLP, FM 3-21.9, *Tactical Employment of Antiarmor Platoons and Companies*, is a sound example of breaking down of TLP.

[4] First Army OC/T Leaderbook, Rules #5 and #6.

[5] National Guard and Reserve soldiers returning from OIF/OEF can join the Operation Warrior Trainer (OWT) Program and serve on active duty an additional 12 months at an MTC to share their knowledge and TTP. *<http://www.first.army.mil/owt.htm>*.

[6] Brigadier Nigel R.F. Aylwin-Foster, "Changing the Army for Counterinsurgency Operations," *Military Review*, November-December 2005, pages 2-15.

[7] FM 3-21-91, Section II, Paragraph 2-7. Specific steps of the MDMP help coordinate staff and commander responsibilities. The company commander and platoon leader have subordinate leaders, but not a staff, which places the burden of planning on their shoulders. TLP reflect this reality while incorporating the spirit, language, and general process of the MDMP to assist in the preparation of an OPORD.

[8] OIF Change 8 to FORSCOM Regulation, March 2006.

[9] The installation and TSB commander will not validate a deploying unit until requirements are met.

[10] The 4th Brigade, 87th Division, commander implemented his combat counterpart program in the Fall of 2005, using his TSBn commanders and command sergeants major as the "OTMs." assigned at battalion level for the six battalions of the 1-34th BCT. Special thanks to the 1-167 RSTA Squadron, who demonstrated outstanding MDMP/TLP and painted an example of what right looks like.

[11] At least 8 of the 96 units that trained and deployed from Fort McCoy in 2007 were over 50 percent cross-leveled according to MTC McCoy MAT BUB charts, to include a unit with members from more than 30 different states.

[12] LTG David H. Petraeus, "Learning Counterinsurgency: Observations from Soldiering in Iraq," *Military Review*, January-February 2006, pages 2-12.

[13] MG Peter Chiarelli and MAJ Patrick Michaelis, "Winning the Peace – The Requirement for Full-spectrum Operations," *Military Review*, July-August 2005, pages 4-17. <*http://www.au.af.mil/au/awc/awcgate/milreview/chiarelli.pdf*>. Accessed 26 April 2007.

[14] The Lessons of History, <*http://www.mackenzieinstitute.com/1998/newsletter070198.htm*>.

[15] OTM Full-Spectrum Team Logo created by MAJ David Sierakowski, March 2006 (see page 6.)

[16] The 4th Cavalry Brigade played a large role in augmenting the 181st Infantry Brigade training efforts during the peak mobilization season in 2006 by assuming several training lanes and providing OTMs for three engineer battalions. They developed the concept of the "Big 8" evaluation criteria, which were revised into the "Big 10" criteria depicted in the article.

[17] The commander of the 395th Finance Battalion helped validate almost every PDP topic with great AAR feedback.

[18] Remember when you were a young leader. Was your commander there 24/7; or instead, did he/she let you learn mainly from your NCOs and make some mistakes in private?

[19] FM 6-22.

[20] 4th Cavalry Brigade's "Big 8" Assessment Tool was the forerunner of the 181st Infantry Brigade's "Big 10."

[21] 135MM = Class I, III, V and Maintenance and Movement.

[22] Major John Nagl, "The Counterinsurgent," *New York Times Magazine*, January 11, 2004, page 7.

[23] Hans Finzel, *Top 10 Mistakes Leaders Make*, Wheaton, Illinois: Victor Books, 1994.

[24] FM 7-10, page 44; "Maneuver: Address each subordinate element by name and give them their mission statement."

[25] The commander or the BSB, 1-34th BCT, and the commander of the 1-167th RSTA Squadron have sent 1st Brigade, 85th Division, leaders numerous lessons learned and exemplify the "full-spectrum operations" in their newsletters at <*http://www.redbullweb.com/24.html*> and <*http://www.neguard.com/UNITS/1-167cav/index.htm*>.

Regimental Awards

Each year, we recognize the best engineer company, lieutenant, noncommissioned officer, and enlisted Soldier—in each of the components—for outstanding contributions and service to our Regiment and Army. Every engineer unit in the Regiment can submit the name and achievements of its best of the best to compete in these distinguished award competitions. Only the finest engineer companies and Soldiers are selected as recipients of these awards. The Soldiers will carry throughout their careers the distinction and recognition of being the Engineer Branch's best and brightest Soldiers and leaders. Following are the results of the 2006 selection boards for the Itschner and Outstanding Engineer Platoon Leader (Grizzly) Awards, the Sturgis Medal, and the Van Autreve Award:

Active Army

Itschner Award: United States Army Forces Command (FORSCOM) nominee, 618th Engineer Support Company (ESC) Airborne (ABN), Fort Bragg, North Carolina.

Outstanding Engineer Platoon Leader (Grizzly) Award: United States Army Europe (USAREUR) nominee, First Lieutenant Tobias K. Watson, Charlie Company, 40th Engineer Battalion, 1st Armored Division Engineer Brigade.

Sturgis Medal: United States Army Pacific (USARPAC) nominee, Sergeant First Class Jeffery Goodman, 66th Engineer Company, 2d Stryker Brigade Combat Team (SBCT), 25th Infantry Division.

Van Autreve Award: FORSCOM nominee, Corporal Kevin C. O'Quinn, Headquarters & Headquarters Company (HHC), 27th Engineer Battalion, 20th Engineer Brigade.

United States Army Reserve

Itschner Award: Detachment 1/961st Engineer Battalion (Combat) (Heavy), Wisconsin United States Army Reserve.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Wesley T. Craiglow, Bravo Company, 489th Engineer Battalion, Arkansas United States Army Reserve.

Sturgis Medal: Staff Sergeant Nathaniel C. Day, Charlie Company, 489th Engineer Battalion, Arkansas United States Army Reserve.

Van Autreve Award: No nomination.

Army National Guard

Itschner Award: 913th Engineer Company (CSE), Tennessee Army National Guard.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Terry D. Durham, Charlie Company, 201st Engineer Battalion, Kentucky Army National Guard.

Sturgis Medal: Sergeant Guy M. Stevens, Alpha Company, 164th Engineer Battalion, Missouri Army National Guard.

Van Autreve Award: Specialist Paul D. Simpson, 191st Engineer Company, Ohio Army National Guard.

The award recipients were recognized at ENFORCE 2007 on 23 May 2007, at Fort Leonard Wood, Missouri.

U.S. Army Engineer Specialized Search Dogs

By Captain Danielle M. Roche and Mr. James Pettit

In 2002, the United States Army Engineer Regiment was directed by the Vice Chief of Staff of the Army to establish a unique dog detachment at Fort Leonard Wood, Missouri. Training for two types of engineer detection dogs was specified—mine detection dogs (MDDs) and specialized search dogs (SSDs). Each type of dog would have different capabilities and operational uses but would share the same mission: minimizing the threat to Soldiers from explosive hazards. Since 2003, trained teams consisting of a handler and a military working dog have been continuously deployed to Afghanistan and Iraq, served in National Training Center rotations, and provided countless demonstrations and briefings to educate the U.S. military about the capabilities, limitations, and employment techniques of MDD and SSD teams. In 2005, the detachment reorganized and grew to three detachments. More growth of the engineer dog teams is planned to occur in 2008.

While MDDs are trained to find land mines and buried unexploded ordnance, SSDs are trained to find firearms, ammunition, and explosives during route searches, building searches, open areas, and vehicle searches at all threat levels. SSDs always work under the direct control of their handler. The SSD concept is based on the firearms, ammunition, explosive detection dogs developed by the British Army for use in counterterrorist operations. The United Kingdom (UK) is currently the world leader in training explosive detection dogs and produces some of the highest quality dogs available. Using the knowledge base and experience from the UK, the U.S. Army hired several retired UK dog trainers to serve as instructors for the United States Air Force SSD course at Lackland Air Force Base, Texas, and the United States Army Engineer School MDD course at Fort Leonard Wood.

> *"...dogs provide a fast and efficient detection capability that can save lives."*

The four-month SSD course trains combat engineers along with Marines, Airmen, and military police Soldiers. Before the training moved to Lackland Air Force Base, the training was performed at Fort Leonard Wood, where three graduating classes trained a total of 21 Soldiers to be SSD handlers.

To obtain the maximum value from the services of trained MDD and SSD teams, it is essential to have a sound understanding of the capabilities and conditions for their employment. Both types of dogs provide a fast and efficient detection capability that can save lives. They have excellent mobility and utility over ground that is not accessible to vehicles and other mechanical clearance and detection

A handler and his SSD search an area for suspicious devices.

equipment. They can detect a device without touching the device itself, providing safety to the handler and those around them. The dogs can recognize mines, unexploded ordnance, explosives, firearms, and ammunition by the distinctive odor of the explosives or other components of the devices. The dogs then show a change in behavior, recognizable by the handler, indicating that they have discovered a scent they have been trained to locate.

Using dogs is much faster than using mechanical or manual searches and reduces the time spent on searches. However, the actual continuous working time and the number of tasks that the teams can perform will depend on the ability and character of the individual dog. Engineer dogs are trained to be bold, to be steady under gunfire, and not to be distracted by other animals. They can work in areas and situations where personnel, movement, and noises are present. It is imperative to note that dog teams are not a stand-alone system for conducting detection operations. The teams require security at all times, and may often require an escort to assist in maneuvering through areas. If the mission dictates that an obstacle or threat must be cleared, engineers or explosive ordnance disposal (EOD) personnel will be required. Dog handlers are not trained for deactivating, destroying, or clearing obstacles or threats.

One challenge to the use of dogs in detection operations is the fact that a dog can only be handled by one Soldier at a time. Because of the extensive training and the rapport that the team must develop, there is only one handler per dog and one dog per handler. Dogs may suffer a lowering of performance if excessive distracting elements are present, may be reluctant to negotiate areas that may prove physically harmful, and may be of little value for searching persons. The dogs are trained to work with Soldiers who always carry weapons and explosives, so using the dogs to search persons could confuse the dogs.

Commanders are encouraged to request SSD teams before entering areas with a high probability of encountering improvised explosive devices (IEDs), weapon caches, or explosives. Once a team is assigned to support a mission and the handler is briefed, the commander should obtain the handler's recommendations for the most effective employment of the team and the best working positions, consistent with the factors that influence the dog's detection capabilities. The dog team should participate in any mission rehearsals. The commander must ensure that security and safety are provided for the team at all times. For extended missions, dog teams require administrative, logistical, and operational support. They also require veterinary support throughout a deployment, but the United States Army Veterinary Command handles this at most deployment locations. The engineer dog detachments have assigned veterinary technicians that deploy with the dog teams. The teams deploy with field expedient kennel facilities sufficient for short-term operations but require semipermanent facilities for long-term operations.

Based on the support requirements detailed above, SSD teams usually are based at forward operating bases. This allows SSD handlers to conduct the required realistic training and gives them access to theater-specific firearms, ammunition, and explosives to maintain the proficiency of the dog teams for maximum mission effectiveness. It is in the commander's interest that the dogs be familiar with every known explosive and other casualty-producing device that the unit may encounter. Although the dogs receive continuation training when not on missions, the handlers' access to the latest items is limited. When possible, supported units should provide samples of any new or different devices encountered in the field so the dogs can become familiar and proficient with finding them. EOD units can best assist the dog teams with specific training aids.

Lastly, before a dog is introduced to a new operational environment, the team should be given the time and resources to practice searching under appropriate conditions. This ensures that the dog is physically capable of locating explosives and other casualty-producing devices in the specific theater of operation.

A handler displays buried explosives found by his SSD.

Before a dog team goes operational, several accreditation tests are conducted. Testing of SSDs and handlers is mandatory and occurs in three phases:

- Predeployment confirmation testing in the United States.
- In-theater testing at the base camp or in an established training area.
- On-site confirmation testing before any live operations.

The dog teams have a strict standard of performance and rigorous testing procedures. These can be compared with a driver's license test, which aims to establish confidence in the ability to perform under some conditions without testing against all possible conditions. The same principle applies for a dog's operational accreditation test. Its purpose is to provide confidence in a basic capability to detect explosives. Passing an operational accreditation test is evidence of confidence and trust.

The greater complexity and danger of explosives detection requires that the proficiency standards for SSD teams be significantly higher than for any other type of dog team. Therefore, certification depends on the demonstrated knowledge and handling skill of the handler and the explosives detection rate of the SSD. Handler proficiency is evaluated by having the handler demonstrate detailed knowledge of the characteristics of each of the explosives the team is trained to detect, how these explosives may be used in explosive devices, and specific operational techniques used in the theater of operation.

Captain Roche is the commander of the 94th Engineer Detachment (Canine), Fort Leonard Wood, Missouri, and is an SSD supervisor. Her previous assignment was support platoon leader for Headquarters, Headquarters Company, 2d Engineer Battalion, 2d Infantry Division, Camp Castle, Korea. She is a graduate of George Mason University, Fairfax, Virginia, with a bachelor's in health and fitness.

Mr. Pettit developed and stood up the Engineer Detection Dog Program starting in 2001 and is the technical advisor to the Engineer Regiment on the use of detection dogs. He works for the Counter Explosive Hazards Center at the United States Army Engineer School, Fort Leonard Wood, Missouri.

Support Our Troops

DIVE COMPANY EXPERIENCES NORTHWEST DIVING

By First Lieutenant Brett D. Evans

The northwest is known for inclement weather; it's not usually a question of *if* it will rain, but rather *when*. Divers from the 511th Engineer Light Diving Team worked for 2 weeks in temperatures ranging from the low 20s to high 30s while conducting dive operations in support of the United States Army Corps of Engineers® (USACE) Portland District. After 7 consecutive days of rain, everyone could feel the cold, especially those tending divers 60 feet below.

USACE tasked the 511th to conduct a variety of repairs, improvements, and inspections on the John Day, The Dalles, and the Bonneville Dams. All three dams are located on the Columbia River Basin east of Portland, Oregon. This is the most hydroelectrically developed river system in the world and includes more than 400 dams of all types. The three dams alone are capable of producing 5.3 million kilowatts of power at peak production.[1] That's enough to meet the electrical needs of four cities the size of Seattle, Washington, or 2,300,000 homes.[2]

The diving conditions on the Columbia River are also different than one might expect. Depths can exceed 150 feet in many parts of the river, and water temperatures in the winter usually average 42 degrees Fahrenheit. The 511th used hot water suits to combat the effects of hypothermia while diving. An insulated pipe in the umbilical line links the diver to surface support and carries the hot water down to the suit.

Two engineer divers enter the water at The Dalles Dam to conduct inspections and maintenance.

The dive team began the operation at the John Day Dam on 4 December 2006. The team conducted inspections on the dam's north-side spillway and installed a cover plate over a discharge pipe. USACE engineers needed the 511th to determine if backwash and debris were eroding the spillway apron on the downriver side of the John Day Dam, so they spent 2 days recording footage and taking measurements to provide USACE personnel the information needed for future improvements.

At The Dalles Dam, divers were tasked with two jobs. The first task was to install dogging devices, which hold headgates to the upriver side of the dam. Headgates are massive structures designed to hold back water at a pressure of 14,000 pounds

A stand-by diver sits on a bench, prepared to react in the event of an emergency.

per square inch. The second task was to inspect the north-side fish ladder gate seals. Fish ladders are a system of concrete steps that allow fish to swim upriver to spawn.

Final operations were conducted at the Bonneville Dam from 11–15 December 2006. At this site, the 511th cleaned gate seals, installed water-level gauges for the fish ladders, and removed debris from the upriver trash racks (a cagelike attachment that collects large debris). The accumulated debris found on the trash racks can consist of many things—from logs to dead animals. On this mission, the 511th manually removed small logs, which in some cases required the use of a crowbar and some ingenuity.

The mission was a success. Despite the rain and cold, the dive team completed 17 dive evolutions in 9 days, for a total of more than 41 hours of bottom time—the time from when the diver leaves the surface in descent until he begins ascent. It was estimated that USACE saved $66,000 by requesting assistance from the 511th to conduct these tasks. Not only was this mission a unique diving opportunity for the 511th, but it also allowed the unit to foster cooperation with the USACE Portland District.

First Lieutenant Evans is the platoon leader for the 511th Engineer Light Diving Team with the U.S. Army Dive Company (Provisional) at Fort Eustis, Virginia. He is a graduate of the Engineer Officer Basic Course, the Marine and Engineer Dive Officer (MEDO) Course at the Naval Diving and Salvage Training Center, and the Sapper Leader Course. He holds a bachelor's in liberal studies from the University of Montana, Missoula, Montana.

* * *

Endnotes

[1] United States Army Corps of Engineers Portland District, <*http://www.nwp.usace.army.mil/op*>, accessed on 8 February 2007.

[2] Ibid.

USACE Achieves Major Milestone at Superfund Site

By Mr. Eugene R. Urbanik

In February, the United States Army Corps of Engineers® (USACE) New York District achieved a major milestone when it began the demolition of the industrial park facility at the Cornell-Dubilier Electronics Superfund[1] site.

From 1936 to 1962, Cornell-Dubilier Electronics, Incorporated, manufactured electronic parts and components in South Plainfield, New Jersey. It is alleged that during its operations, the company dumped polychlorinated biphenyls (PCB)-contaminated materials and other hazardous substances directly onto site soils. Since then, numerous companies have operated at the site as tenants. It is estimated that 8,700 residents live within one mile, more than 500 live within a quarter mile, and some live less than 200 feet from the site.

The New Jersey State Department of Environmental Protection recognized the magnitude of the problem and requested assistance from the United States Environmental Protection Agency (EPA). The EPA's Region II conducted soil borings at the site and surrounding properties. The soil at the site is contaminated with volatile organic compounds and PCBs. Also, building interiors at the site contain elevated levels of PCBs and metals that are probable human carcinogens (substances known or suspected to cause cancer). Contamination was extensive and uncontrolled—impacting sediment, soil, and groundwater and posing potential health risks to residents and tenants. The EPA requested assistance from USACE to clean up the site.

The magnitude and nature of the clean-up project provided an opportunity for a team to be assembled with specialists from three USACE districts and two divisions. Personnel from each district play a critical role in the project. The New York District leads the remedial action phase by managing a cost-reimbursable contract for the residential property work and a fixed-price contract for the demolition of the current industrial park that is located at the site of the former Cornell-Dubilier Electronics facility. The Environmental Residency of

(Continued on page 25)

Demolition began at the Cornell-Dubilier Electronics Superfund site in February 2007.

THE ARMY'S NEWEST MOS

By Sergeant Major Ethan A. Jones

For the first time in fifteen years, the Army has a new career management field (CMF) and military occupational specialty (MOS). The United States Army Acquisition Support Center (USAASC) has introduced CMF 51, Acquisition, Logistics, and Technology (AL&T) and MOS 51C, AL&T Contracting Noncommissioned Officer (NCO), into the full-spectrum Army. These NCOs will have the potential to become warranted Contingency Contracting Officers (CCOs) who are authorized by law to procure supplies and services and contract minor construction in support of deployed forces, which is vital to mission success.

AL&T Contracting NCOs will be assigned to the Army Sustainment Command (ASC), formerly the Army Field Support Command (AFSC), at Rock Island, Illinois. These NCOs will perform their contingency contracting mission and roles while assigned to units such as contracting support brigades, contingency contracting battalions, senior contingency contracting teams, and contingency contracting teams. All contracting commands, units, and teams are a part of the modular contracting force structure and the Army Force Generation (ARFORGEN) cycle, providing contingency contracting support anywhere, anytime. These units and teams will be evaluated and assessed during National Training Center, Joint Readiness Training Center, and Joint Multinational Readiness Center rotations and joint exercises.

Artwork courtesy AMC Office of Command Contracting website

Evolutionary acquisition is the preferred strategy for rapid acquisition of mature technology; spiral development is the preferred process.

USAASC, as the proponent for CMF 51 and MOS 51C, will be responsible for the life cycle management process—consisting of recruitment, retention, individual training and education, distribution, sustainment, professional development, and separation—for the new CMF and Contracting NCOs. Effective 1 October 2007, Soldiers from any MOS, in the rank of staff sergeant through sergeant first class, with less then 10 years of active duty service in the Active Army, United States Army Reserve, and Army National Guard—and who meet the prerequisites for MOS 51C—will be allowed to request reclassification.

As the Army continues to restructure to deter, deny, and defeat U.S. adversaries anywhere in the world, the contingency contracting military workforce is redefining itself to meet the requirements of supporting both conventional and unconventional forces. A brigade combat team must have the capability to sustain itself for the first 30 days of an operation. To achieve this goal, innovative and creative support is required, and contracting is one of the many force multipliers to make that happen.

For more information, contact Major James Bamburg, the MOS 51C proponent, at 703-805-2732, or <*james.bamburg@us.army.mil*>.

Sergeant Major Jones serves as the Army's senior contracting NCO and principal technical NCO advisor to the Assistant Secretary of the Army (Acquisition, Logistics & Technology) and ASA (ALT) Military Deputy. He also serves as the senior enlisted advisor to the Director, Army Contracting Agency. He holds a bachelor's in public relations and in mass communication from Paine University, Augusta, Georgia, and is pursuing a master's in acquisition management from American Graduate University, Covina, California.

Fallen Hero Honored by Engineer Regiment and Soldier-Artist

By Mr. Christian DeLuca

An oil painting of SFC Paul R. Smith by military artist CW2 William Smock was dedicated to the CEHC, Fort Leonard Wood, during ENFORCE 2007.

During ENFORCE 2007, the Engineer Regiment honored one of its own by dedicating the new state-of-the-art Counter Explosive Hazards Center (CEHC) to Sergeant First Class (SFC) Paul R. Smith, an 11th Engineer Battalion Soldier who made the ultimate sacrifice when his task force was violently attacked by enemy forces near the Baghdad International Airport on 4 April 2003. Hastily forming a defense with the men and equipment he had available, Smith braved hostile enemy fire in order to engage the attacking force and evacuate wounded Soldiers. Two years later, on 4 April 2005, SFC Smith was posthumously awarded the Medal of Honor for "…acts of gallantry and intrepidity above and beyond the call of duty… ."[1]

It seemed appropriate to Fort Leonard Wood officials to dedicate the CEHC facility, which is "designed to find solutions to the most prolific and dangerous threat to our Army,"[2] to SFC Smith, "who epitomizes everything we look up to in a Soldier, sapper, and leader and who all of the Engineer Regiment looks up to as a hero."[3]

During the dedication ceremony, a Medal of Honor flag, presented by President George W. Bush to SFC Smith's widow Birgit, was on display. In addition, she unveiled two paintings dedicated to the building. One of the paintings, entitled "The Firefight in the Courtyard," depicts the battle that took Smith's life. It was painted by Patrick Haskett, an Army veteran and military artist, and dedicated by BAE Systems, a contractor that produces defense systems for the military. The second is a portrait of Smith in his desert camouflage uniform, painted and dedicated by Chief Warrant Officer 2 (CW2) William Smock, 1-163d Field Artillery Battalion, Indiana Army National Guard. Smock presented a second portrait to Birgit Smith.

The Chief of Staff at the United States Army Engineer School had met CW2 Smock while deployed to Iraq, and when the idea came about to hang a portrait of SFC Smith in the CEHC building, Smock's name was the first to come to mind to paint it. An e-mail was sent to Smock, asking him if he would be interested in painting SFC Smith's portrait. After reading what had been written about Smith, Smock responded saying that he would paint two portraits—an oil painting to hang in the CEHC building and a watercolor painting to be presented to Birgit Smith.

Although Smith's was the first portrait Smock has done to honor a fallen Soldier, the National Guardsman—who is an elementary art teacher in civilian life—has been painting for Soldiers for some time now.

Smock has been a part of the Indiana Army National Guard since he joined the 113th Engineer Battalion in 1971. He was commissioned a second lieutenant in 1976 and worked his way up the ranks to lieutenant colonel. Unable to progress from there—and not ready to get out of the military—Smock decided to resign his commission as a lieutenant colonel in April 2004 to become a warrant officer to deploy to Iraq. He had friends who were deploying overseas, and he wanted to go too. As a radar warrant officer, he could stay in the Indiana National Guard and deploy with his unit to Iraq.

Smock was finally scheduled to be deployed to Iraq at the beginning of 2005, with the 139th Field Artillery. So at Christmas in 2004, he told his children not to buy him anything because he wouldn't be able to take it with him. But they got him something anyway—a calendar, filled with family pictures.

This watercolor portrait was painted by CW2 William Smock and presented to SFC Paul R. Smith's wife Birgit Smith.

When he saw them, he started to cry. He turned to January and saw a picture he hadn't seen in 20 years. And as he flipped through the months, tears were streaming down his face as his mind replayed the events in the photos.

In Iraq, CW2 Smock ran a Q 36 radar at night to locate enemy mortar and rocket positions. And during the day, to help pass the time, he began painting landscapes with a small watercolor set that a teacher friend had sent him. He looked at his paintings of Radar Hill, where his unit was located, and he looked at the calendar his children had given him, and he decided to make a calendar for each of the 15 Indiana National Guardsmen. After finishing the first 12 paintings, he sent them to his daughter to have the calendars made. (As it turned out, he not only painted calendars for Soldiers in his unit but also for Soldiers from the five battalions and the firemen stationed in the same area.)

CW2 Smock painted the calendars for Soldiers to have for their enjoyment, as a memory of a part of their life they will not forget. It was his way of saying thank-you to them for serving our country. His dedication to his country, as well as to his fellow Soldiers, make him an inspiring example of what it means to be a citizen-Soldier.

Mr. DeLuca is a photojournalist with the Fort Leonard Wood newspaper, the Guidon. He served as a combat correspondent with the United States Marines from 1997 to 2001. He is a graduate of the Basic Journalism Course and the Intermediate Photojournalism Course at the Defense Information School, Fort Meade, Maryland, and holds a bachelor's in film studies.

Photos by Christian DeLuca.

Endnotes

[1] SFC Paul R. Smith's Medal of Honor citation. See *Engineer*, July-September 2005, back cover, for complete citation.

[2] CEHC building dedication remarks by MG William H. McCoy, Commanding General, U.S. Army Maneuver Support Center and Fort Leonard Wood/ Commandant, United States Army Engineer School, 23 May 2007.

[3] CEHC building dedication remarks by LTC Kent Savre, CEHC director, 23 May 2007.

("USACE Achieves Major Milestone," continued from page 22)

the New Jersey Area Office is managing on-site construction activities; the Baltimore District is managing key commercial real estate relocation services; and the Kansas City District is responsible for remedial design and technical assistance.

Current work includes demolition and environmental abatement of 18 industrial buildings, transporting contaminated material to disposal facilities, and soil removal at four residential homes. Extensive safety procedures are in place to protect the health of residents in and near the site. Future work includes a railroad spur installation to reduce transportation and disposal costs, on-site soil treatment of the industrial park materials, the investigation of 59 additional residential properties, and wetlands and groundwater investigation.

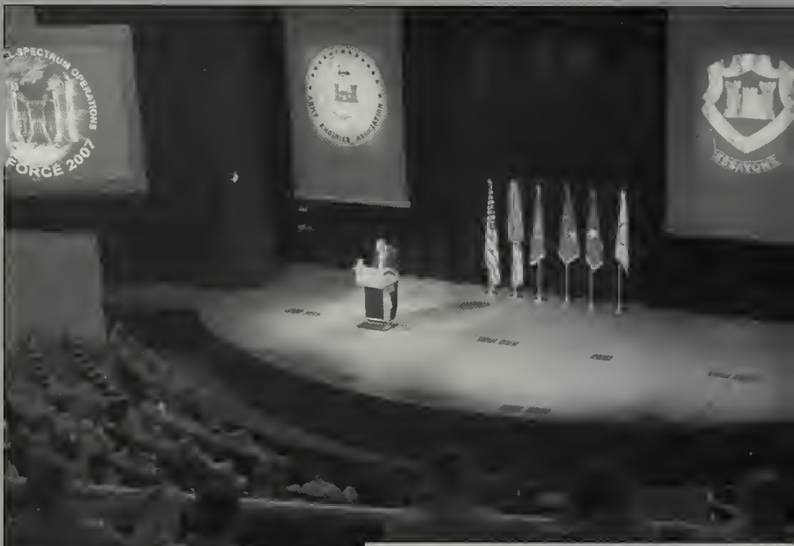
The project, which has several more phases before completion, is expected to cost more than $80 million. The industrial park soil remediation will begin after the demolition is completed in 18 months, and the overall project is expected to be completed by 2011.

Mr. Urbanik, the New Jersey Area Engineer, is a licensed professional engineer and professional planner in the state of New Jersey. A retired Army Reserve lieutenant colonel, he is a graduate of the Command and General Staff College and holds a bachelor's in civil engineering from Rutgers College of Engineering.

Endnote

[1] The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), referred to as *Superfund*, authorizes the Environmental Protection Agency to respond to releases or threatened releases of hazardous substances that may threaten public health or the environment. Superfund sites are the nation's worst toxic waste sites.

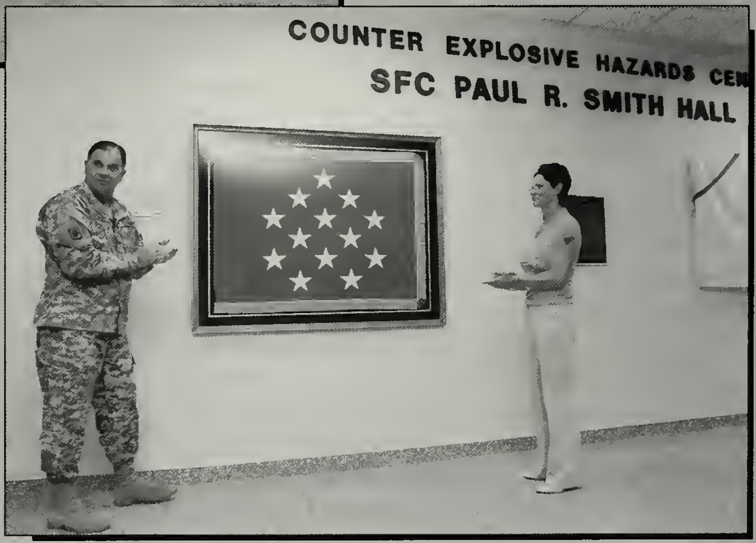
ENFORCE 2007



The Army Engineer Regiment honored its past, celebrated its present, and envisioned its future during ENFORCE 2007 from 20-24 May. The activities began in St. Louis, Missouri, with the Army Engineer Association (AEA) Engineer Regimental Training Conference, which included two days of United States Army Engineer School, United States Army Corps of Engineers, and industry briefings, all focusing on the ENFORCE theme "Engineers in Full-Spectrum Operations."

Activities began on Fort Leonard Wood on 23 May with a ceremonial Regimental Review at the United States Army Maneuver Support Center plaza.

CW2 William Smock painted this oil portrait of SFC Paul R. Smith and dedicated it to the CEHC. He presented a watercolor portrait to SFC Smith's wife, Birgit Smith.



The new Counter Explosive Hazards Center (CEHC) was dedicated to Medal of Honor recipient SFC Paul R. Smith, an 11th Engineer Battalion Soldier who was killed during a firefight with Iraqi forces in 2003. This Medal of Honor flag was presented to Birgit Smith by President George W. Bush in 2005.

Photo by Christian DeLuca

The Regiment held a remembrance service at the Engineer Memorial Grove for 67 engineer Soldiers who gave their lives during the past year in the War on Terrorism. Their sacrifice will never be forgotten.

"The Firefight in the Courtyard," painted by Patrick Haskett, depicts the battle scene that took SFC Paul R. Smith's life.

In his "State of the Regiment" address, Chief of Engineers LTG Robert L. Van Antwerp talked about working on the "Army Strong" campaign, and he introduced a motto that fits the Regiment: "Engineer Ready."

egimental Ball included the presentation of the
er, Outstanding Engineer Platoon Leader (Grizzly),
utreve, and Best Sapper Competition Awards, as well
Sturgis and de Fleury Medals.

ENFORCE concluded on 24 May with a Council of Colonels, a Council of Sergeants Major, the United States Army Corps of Engineers Commanders Meeting, a Regimental barbecue, and a golf tournament.

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Captions by Christian DeLuca, Fort Leonard Wood Guidon staff.

Photos not identified are by Mike Curtis and Mark Scovell, Fort Leonard Wood Multimedia Visual Information Service Center.

3d Annual Best Sapper Competition

By Mr. Christian DeLuca

The 3d annual Best Sapper Competition at Fort Leonard Wood, Missouri, lived up to its name from 1 – 3 May as mental and physical exhaustion took its toll on seven of the thirteen 2-man teams, leaving only six to cross the finish line—and one to be named best sapper team. The "Tropic Lightning" team from the 66th Engineer Company, Schofield Barracks, Hawaii, took top honors in the grueling three-day ordeal that tested the combat engineer skills of participants, while subjecting them to substantial physical strain.

Over the three-day course, competitors must—

- Pass a physical fitness test.
- Perform a military operations on urbanized terrain (MOUT) breach of two exterior doors using explosive breaching methods.
- Tie knots used in mountaineering.
- Use an AN/PSS-12 mine detector to locate five mines.
- Qualify on the grenade range.
- Calculate the placement of timber cutting, steel cutting, breaching, and field expedient charges.
- Construct and swim with a poncho raft.
- Negotiate a vertical obstacle using the prusik climbing technique and the buddy rappel technique.
- Identify threat mines.
- Transmit a 9-line improvised explosive device (IED) report.
- Assemble and perform a function check of weapon systems.
- Destroy a wooden target using an abatis charge.
- Engage targets with pistol, rifle, and squad automatic weapon.
- Perform a MOUT breach, enter, and clear a building and engage multiple targets.
- Calculate and place an inert charge on a steel target.
- Provide combat lifesaver (CLS) medical care to injured Soldiers.
- Transmit a 9-line medical evacuation (MEDEVAC) request.
- Destroy a concrete target using a counterforce charge.
- Perform a 9-mile run with nine arduous "mystery" events.

Sapper Teams

1.	First Lieutenant Mark Gillman Sergeant Gordon Paulson	66th Engineer Company Schofield Barracks, Hawaii
2.	First Lieutenant Colby Krug Staff Sergeant Erasmo Flores	66th Engineer Company Schofield Barracks, Hawaii
3.	Captain John Evangelista Captain Jason Winkelmann	554th Engineer Battalion Fort Leonard Wood, Missouri
4.	Second Lieutenant Christopher Vernon Second Lieutenant Brad Miller	554th Engineer Battalion Fort Leonard Wood, Missouri
5.	Staff Sergeant Douglas LeBoeuf Second Lieutenant Kenneth Stover	554th Engineer Battalion Fort Leonard Wood, Missouri
6.	Sergeant First Class Eric Prescott First Lieutenant Alex Viox	911th Engineer Company Fort Belvoir, Virginia
7.	Specialist Michael Cessaro Specialist James Parthemer	37th Engineer Battalion Fort Bragg, North Carolina
8.	Sergeant Brian Telega Specialist David Menjares	37th Engineer Battalion Fort Bragg, North Carolina
9.	Specialist Nicholas Wardwell Specialist Jarred Wade	50th Engineer Company Fort Leonard Wood, Missouri
10.	Sergeant Jeremy Gaspard Sergeant Aaron Cole	50th Engineer Company Fort Leonard Wood, Missouri
11.	Staff Sergeant Kevin Wiseman First Lieutenant Daniel Hayes	515th Engineer Company Fort Leonard Wood, Missouri
12.	Specialist Robert Overstreet Sergeant Jeremy Coffman	5th Engineer Battalion Fort Leonard Wood, Missouri
13.	Sergeant Michael Robinson Specialist Jose Payes	5th Engineer Battalion Fort Leonard Wood, Missouri

2007 Best Sapper Competition Winners*

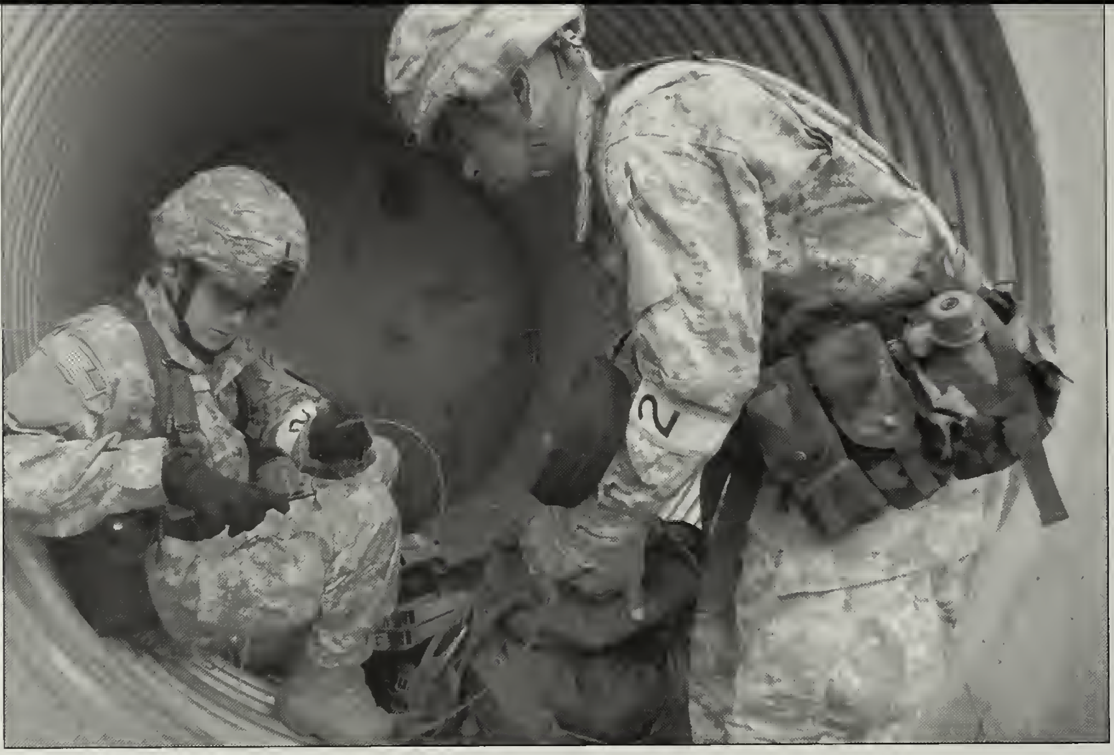
Overall

First Place	Team 2
Second Place	Team 3
Third Place	Team 1

Events

1. Physical Fitness Test	Team 3
2. MOUT Breach I	Team 2 Team 3
3. Knot Tying	Team 1
4. AN/PSS-12 Mine Detector Evaluation	Team 1
5. Grenade Range Qualification	Team 6
6. Timber-Cutting Charge Evaluation	Team 1 Team 3 Team 4 Team 6
7. Poncho Raft Swim	Team 2
8. Prusik Climb and Buddy Rappel Evaluation	Team 3
9. Threat Mine Identification	Team 6
10. 9-Line IED Report	Team 3
11. Weapons Assembly Evaluation	Team 1 Team 2
12. Demolition Calculation	Team 1
13. Stress Shoot	Team 8
14. MOUT Breach II	Team 1 Team 2 Team 3
15. Steel-Cutting Charge Evaluation	Team 1 Team 3
16. CLS Evaluation	Team 2
17. 9-Line MEDEVAC Request	Team 6
18. Counterforce Evaluation	Team 1 Team 3 Team 4
19. 9-Mile Run	Team 1

* Multiple entries indicate that more than one team achieved maximum scores.



A team from the 66th Engineer Company prepares their charge during the steel-cutting charge evaluation.

Team 2, from the 66th Engineer Company, which also placed in last year's competition, said they came back to the competition for just one reason—to win. They said the competition seemed to be a little tougher than they remembered from last year.

A team prepares for the breaching event in the competition.

During the awards brunch, Major General William H. McCoy, United States Army Maneuver Support Center and Fort Leonard Wood commanding general, said that all the participants should consider themselves winners.

"I'm tremendously proud of the competitors," Major General McCoy said. "To go through what we put you through these past couple of days, you should all be proud of yourselves individually."

A Soldier from another team said nothing he had done before compared to the Best Sapper Competition. Although he had been through a lot of training, he said it was the toughest thing he had ever done in his life. The commander of the 577th Engineer Battalion, the sponsoring unit, said the competition allows sappers to test their skills and will, while increasing their esprit de corps. Teams compete for about 58 hours and cover about 50 miles. The events test their combat engineer and infantry skills.

The winning team was presented with a bust of retired Lieutenant General Robert B. Flowers, former Chief of Engineers, on 23 May during ENFORCE 2007.

Mr. DeLuca is a photojournalist with the Fort Leonard Wood newspaper, the Guidon. He served as a combat correspondent with the United States Marines from 1997 to 2001. He is a graduate of the Basic Journalism Course and the Intermediate Photojournalism Course at the Defense Information School, Fort Meade, Maryland, and holds a bachelor's in film studies.

Photos by Christian DeLuca

Integrating Lessons Learned at MANSCEN

By Sergeant First Class Paul A. Zacher (Retired)

With the Army heavily engaged throughout the world, the Combined Arms Center (CAC) at Fort Leavenworth, Kansas, recognized the need to share lessons learned quickly with the rest of the Army. The collection and dissemination of lessons learned to predeploying units, leaders, and Soldiers greatly enhances the success of our Army by providing valuable tools to those who need them most. In March 2006, the CAC commander implemented an initiative for sharing Army lessons learned. Lessons Learned Integration (L2I) spreads lessons learned by capturing and sharing emerging "best practices"; relevant observations, insights, and lessons (OILs); and tactics, techniques, and procedures (TTP) from the operating force.

Last August, the Center for Army Lessons Learned (CALL) at Fort Leavenworth trained and sent out more than 40 L2I analysts to implement and strengthen already existing L2I programs at most United States Army Training and Doctrine Command (TRADOC) professional military education (PME) centers and schools and operational centers such as divisional headquarters. The analysts, all civilian contractors, are retired or former active duty personnel who have expertise and experience with the proponent they are assigned to. At the Fort Leonard Wood, Missouri, United States Army Maneuver Support Center (MANSCEN) Directorate of Training (MDOT), L2I analysts support each of the three schools and MANSCEN.

The L2I analysts provide support to TRADOC centers and schools by researching and analyzing issues identified by their proponents or from an array of information sites and systems. The analysts have vast amounts of resources at their disposal and the ability to collaborate with other analysts worldwide to provide support to their activity.

Collection and Analysis Teams (CAATs), another asset available to L2I analysts, are deployed worldwide by CALL to collect relevant and real-time data to be shared. These CAATs, consisting of subject matter experts from many branches and schools, go through a training program prior to the collection process, spend a week collecting data from designated units, and then summarize their findings to be used later in publications, TTP, or lessons learned. Since 11 September 2001, CALL has published hundreds of publications and answered more than 5,000 requests for information (RFIs) annually.

L2I analysts provide many benefits; valuable and useful information has been provided to MANSCEN and the schools for dissemination to leaders and Soldiers through the newly-developed MANSCEN L2I Microsoft® SharePoint website. Relevant and branch-validated information from the field is rapidly shared with appropriate leaders, training developers, and instructors to supplement lesson plans without the need to rewrite programs of instruction (POIs) or doctrine.

L2I analysts are also the direct link to CALL for RFIs or publication requests and for establishing and maintaining the information flow between other analysts where similar units have the same need for information sharing. They "push" information relevant to their activity's needs by "pulling" it from CALL or other resources, thereby alleviating the need for their activity to spend valuable resources. Optimizing the L2I program requires a collaborative effort between the schools and the L2I analysts in pushing and pulling resources to benefit Soldiers in training.

For more information on how the Engineer School L2I analyst can support you, call (573) 563-5340 or e-mail <paul.a.zacher@us.army.mil>.

Sergeant First Class Zacher (Retired) is the MANSCEN Directorate of Training Lessons Learned Integration Analyst in support of the United States Army Engineer School, Fort Leonard Wood, Missouri.

Community *Pines* for Beach Season

By Dr. JoAnne Castagna

If you make a trip to Bradley Beach on the New Jersey shore during the winter months, you may be surprised to see residents walking their dogs along the water, riding bikes on the promenade, and surfing the ice-cold waves in wet suits.

A team of United States Army Corps of Engineers® personnel witnessed this on a February day a couple of years ago when they visited this beach that draws more than 100,000 beachgoers annually. It was obvious that the residents yearn for beach season. Especially since the very dunes they were observing were created by the residents themselves, using donated Christmas trees, in an effort to protect the mile-long shoreline the Corps had restored earlier.

The Bradley Beach shoreline had experienced erosion due to previous storms and was in need of sand nourishment. In July 1999, the New York District began a sand nourishment project on Bradley Beach in Monmouth County as part of the Corps's Sandy Hook to Barnegat Inlet Beach Erosion Control Project. The Corps had 3.1 million cubic yards of sand placed on the shore, which added over 200 feet of beachfront and created seven groin notches and four outfall extensions.

Dunes weren't needed for protection in this area because of the naturally high backshore, so they weren't included in the Corps's project. However, after the project was completed in January 2001, Bradley Beach residents wanted to take an additional step to protect the Corps's work, so they started creating beach dunes using donated Christmas trees. According to the operating supervisor of the Public Works Department for Bradley Beach, a life-long resident there, they wanted to protect the beach's promenade from future storms and give it a look that no other town had.

Beach dunes control erosion by limiting windblown sand loss. In addition, residents wanted to block out noise on the beaches. Now the only noise heard is the sound of the waves and birds. The dunes also protect beach residents' homes and provide them a beautiful oceanfront and privacy.

"...Bradley Beach residents wanted to take an additional step to protect the Corps's work, so they started creating beach dunes using donated Christmas trees."

Bradley Beach isn't the first community along the 21-mile Sandy Hook to Barnegat Inlet Beach Erosion Control Project area to create dunes—Manasquan Beach and Monmouth Beach created dunes using fencing and dune grass or a combination of planting and fencing—but they are the first to use Christmas trees. Every January, the residents place their donated pine Christmas trees on the curbside and a Public Works Department truck picks them up.

In 2005, to support the dunes that were being created, the community designed a dune system called a sawtooth design.

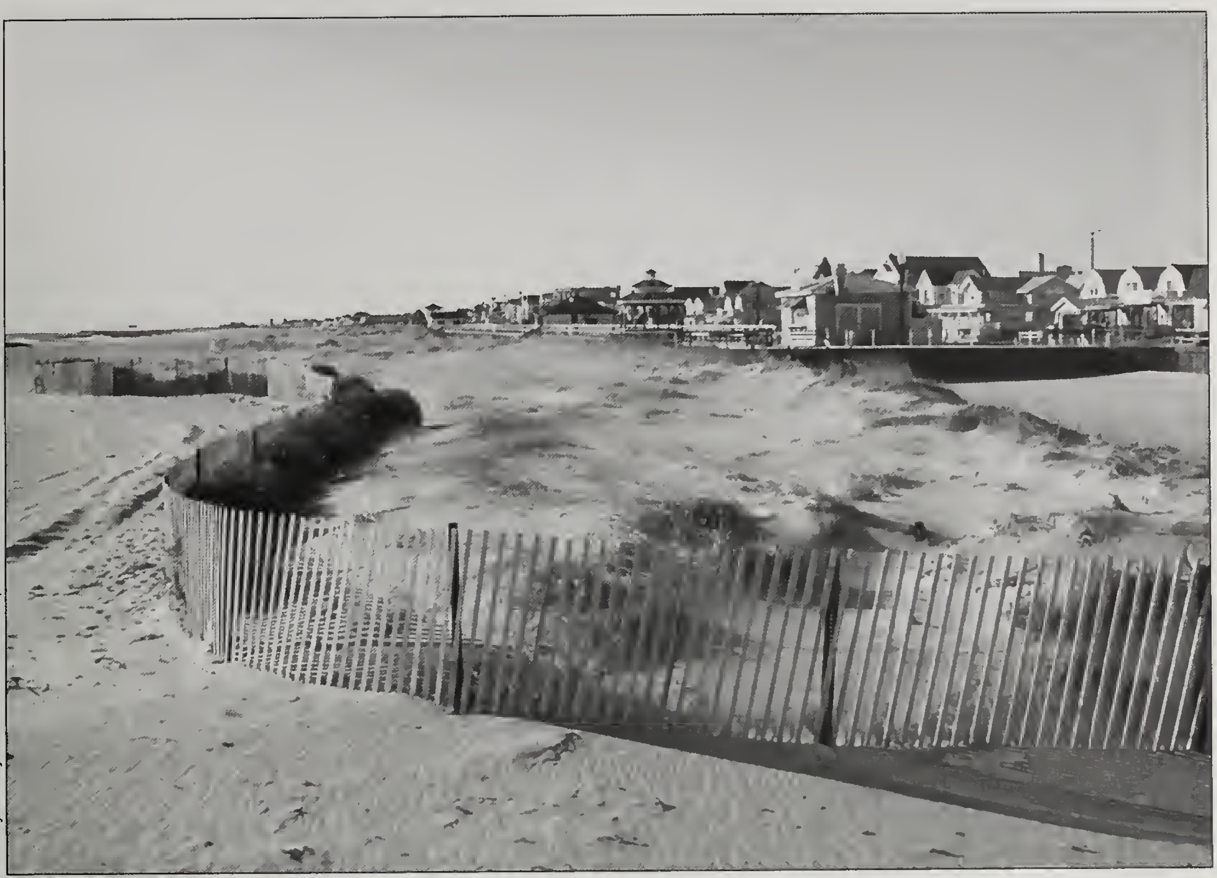


Photo by Bradley Beach Public Works Department

Christmas trees from the past holiday season are placed on the ocean side of the sand dunes where they capture sand blowing inland from the ocean and eventually form permanent dunes.

Snow fences were placed on an angle along the promenade side of the dune to support the dune system and make the beach look appealing from the shore side. As trees are being collected, the Bradley Beach Public Works Department places them on the ocean side of the sand dune where they eventually form permanent dunes. This year the trees were laid down north to south on the east side of the beach, and next year they will do the west side.

As in previous years, dune grass will be planted on top of the dunes. When the project first began, residents of Bradley Beach planted 50,000 plugs of dune grass on the dunes to keep them anchored. The community is in the process of receiving a grant for an additional 25,000 to 50,000 plugs of dune grass that was planted this spring.

The beach dunes have proved to be successful, and the placement of Christmas trees—in combination with the snow fencing and dune grass—has been effective in capturing sand blowing inland from the ocean. Since the beginning of this community project, an estimated 28,000 trees have been used to create a stretch of dunes 25 feet wide and 10 feet high along the mile-long oceanfront.

Community officials are very supportive of the project and think it's beneficial to the public. The mayor of Bradley Beach, a strong supporter and the financier for the project, stated that walking through the dunes from the promenade to the beach feels like leaving one world for another. He will be funding the project until 2008, the year the dune project is expected to be completed. It's this type of community involvement that the Corps likes to see. A proactive municipal Public Works Department is a beneficial addition to any federal or state beach erosion control project. Bradley Beach is trying to aggressively maintain the sand that was placed there and is an active participant in the project's success.

The dunes at Bradley Beach have also proved to be beneficial to the environment, because they provide a more diverse habitat than just sand alone—creating a sanctuary for sparrows and attracting all kinds of insects for wild birds to eat. The residents also find the dunes appealing. Not only are they excited about the beautiful scenery, but they now have a personal connection with the beach since their donated trees will be there forever.

Dr. Castagna is a technical writer-editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

Photo by Barbara Dindl, Fort Drum Housing Office

Real Estate Program Places Military Families in Homes

By Dr. JoAnne Castagna

While stationed in Denmark in 2006, a military couple was living in a tight two-bedroom townhouse with four newly adopted teenage sisters. Their Family grew quite large, quite fast. Living in these crowded conditions, and not thinking that life could get even more challenging, the Army called the Soldier to Afghanistan and the wife to Fort Drum, New York. She packed up her daughters and arrived at the installation in urgent need of a home. Fort Drum, located on 107,265 acres in upstate New York's North Country, is home to the Army's 10th Mountain Division, which trains and deploys thousands of troops.

Because of the Army's new way of doing business, hundreds of military Families are now being stationed stateside. The Army is experiencing its biggest organizational change since World War II. It's changing from a force that was prepared to take on one or two potential wars at one time to an expeditionary force that can deploy continuously to different parts of the world to fight the War on Terrorism. This restructuring is requiring Soldiers and their Families serving overseas to return stateside, resulting in an urgent need for quality housing.

To prepare for this, Army installations such as Fort Drum are eliminating inadequate housing and facilities and improving and constructing others. The United States Army Corps of Engineers®, the Army's construction agent, is building barracks for single Soldiers on the installation. But while Family housing is being built, military Families need affordable offpost housing. The Army, which is traditionally about 80 percent rental, provides Soldiers a base allotment toward housing, whether they reside on- or offpost.

In February 2005, the Fort Drum housing team informed the Corps's New York District that 2,100 temporary,

Photo by Barbara Dindl, Fort Drum Housing Office

A developer renovated a school to be used as homes for Fort Drum military Families.

Photo by Matthew O. Walsh, Army Corps of Engineers

The Divarty Barracks are being constructed at Fort Drum to house single Soldiers.

affordable, quality homes outside of the installation, but within commuting distance, were needed by 2009. New York District personnel, in cooperation with the housing team, began researching the nearby civilian community. The area within a 30-mile radius of Fort Drum is semirural, and the area outside the 30-mile radius is completely rural; Syracuse, New York, is the nearest city.

The New York District created the Domestic Lease Program around the same time. The program encourages land developers to construct or rehabilitate new housing specifically for Soldiers and their Families at installations where housing is hard to find. Under the program, developers are offered a government lease. The developer provides the money for utility services, refuse collection, and maintenance when they are not part of the lease contract.

The District began an education campaign within the 30-mile radius of Fort Drum to inform residents about the program and the Army's need for quality housing. They also placed advertisements in local newspapers, posted flyers, mailed letters, and made telephone calls to a host of institutions—including banks and financial lenders, real estate property associations, community groups, realtors, churches, the Chamber of Commerce, apartment complexes, land surveyors, and assessors. The District encouraged banks and financial institutions to lend money for construction, refurbishments, and new development of housing in a moderate and affordable range. They also worked with interested developers on their unique development needs, educated them about the market, and offered assistance with state and local officials. In addition, the District held meetings with mayors and city and town officials to express the positive economic impact the program would have on their community, and they spoke with the county office responsible for certificates of occupancy to expedite the permit process.

In the spring of 2005, developer Mike Treanor and Associates contacted the Corps about the program. The company had purchased an apartment complex close to the installation with the intent of developing the property into new housing units and thought these units might be suitable for Army Families. The Corps visited the property to ensure that it met Army housing criteria. Then the developer borrowed money from a financial lender and used it to create 33 new housing units—sending a positive message to the market early on. Since then, Mike Treanor and Associates has renovated more than 40 homes and purchased a factory to develop into an additional 32 apartments.

Clover Management, one of the largest developers of affordable housing in New York, also contacted the Corps with interest in the program. In September 2006, the company signed a contract for 103 acres just outside of Fort Drum to build 648 apartments—418 with two bedrooms and 230 with three bedrooms. The complex will also provide an Olympic-size swimming pool, a community room, and a physical fitness facility.

Military Families are benefiting from the innovative program, to include the Family that moved from Denmark. They were housed "right outside the gate" of the installation with "plenty of room, neighbors, a real yard, and room to breathe."

The program is beneficial to other people also. The government would normally select one developer to do all of the work, but this program creates a natural free market approach with healthy competition. The New York District is encouraging other Corps districts to implement this program: the Alaska District implemented it last summer.

The Domestic Lease Program is improving the economy of the community, because it brings in more residents and revenue to the area, creates jobs for developers and service industries, and improves the infrastructure by rehabilitating existing homes and creating new ones. The program is providing quality, affordable temporary housing close to Fort Drum for military Families. The potential housing built around Fort Drum, at no cost to the government, is now more than $100,000,000.

For more information about the Domestic Lease Program, contact the author at <joanne.castagna@usace.army.mil>.

Dr. Castagna is a technical writer-editor for the United States Army Corps of Engineers, New York District.

Photo by Sergeant First Class Scotty Williams, Kentucky Army National Guard

National Guard Uses Technical Colleges to Train Soldiers

By Captain James B. Richmond

In a joint venture, Kentucky Army National Guard engineers and the Kentucky Community and Technical College System (KCTCS) have implemented a program that provides Soldiers the opportunity to attend college-accredited classes in carpentry, electrical wiring, plumbing, and heavy equipment operation during drill weekends. The Kentucky National Guard is transitioning two mechanized combat engineer battalions—the 201st Engineer Battalion and the 206th Engineer Battalion—into a multirole engineer force.

The 201st Engineer Battalion commander realized that the Soldiers needed training in their new military occupational specialty at a beginner's level, but they were waiting on the equipment to be fielded to support it. The unit thought of various ways to train—such as building small sheds and roads at local training areas—but they kept running into the problem of equipment. In a collaborative effort, the 206th Engineer Battalion commander and an instructor at KCTCS came up with a unique way to solve the problem: Train the Soldiers at the local technical schools, using school equipment and certified instructors, thus giving college credit to the Soldiers. At first it seemed too good to be true, but after doing their homework both battalion commanders agreed that it was the best course of action.

The solution for paying for the training was made possible by the Kentucky Tuition Incentive Program. Under this program, Soldiers can receive tuition assistance for attending any state-funded school, as long as they are in good standing in their unit. The battalions presented the program to the State Education Officer and gained her support.

Photo by Staff Sergeant Nathen Roe, Kentucky Army National Guard

A Soldier trains on carpentry skills under the supervision of instructors from the Kentucky Community and Technical College System.

Photo by Master Sergeant Guy Coomer, Kentucky Army National Guard

Soldiers from the 207th Horizontal Company, 201st Engineer Battalion, learn to operate loaders and backhoes.

The second problem was how to overlay the accreditation requirements of these courses during a National Guard training-year calendar of one weekend a month and still be able to conduct the mandatory training requirements of being an engineer Soldier. The brigade operations noncommissioned officer arranged a conference with the KCTCS leadership and developed a training calendar that required five drill weekends. Together they developed a training plan that allowed the instructors the time needed to teach the skills that would also meet the requirements for the college credit. The Soldiers had a whole day of drill to dedicate to instruction, allowing school administrators to develop a lesson plan that worked.

The school system was able to offer the following courses:

- Beginning Carpentry Lab to 21W (carpentry and masonry specialist) Soldiers
- Installation of Plumbing and Fixtures to 21K (plumber) Soldiers
- Basic Alternating Current (AC) Circuits Lab to 21R (interior electrician) Soldiers
- Heavy Equipment Operation to 21E (heavy construction equipment operator) Soldiers

The 201st Engineer Battalion began training with KCTCS in early 2007 and will complete the final coursework in August or September.

This program is a win-win situation. The Soldiers get quality instruction in their new MOS and college credit, KCTCS enrollment is up, and no equipment was required other than what was on hand already.

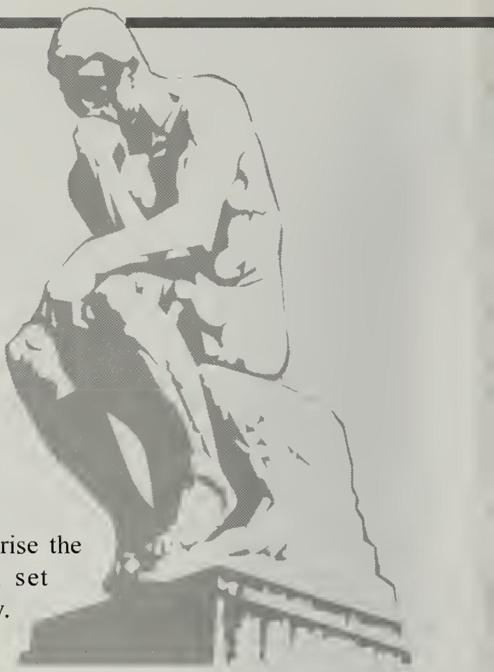
Captain Richmond is the Training Officer for the 201st Engineer Battalion, Kentucky Army National Guard, Ashland, Kentucky.

Dedication

The following members of the Engineer Regiment have been lost in the War on Terrorism since the last issue of *Engineer*. We dedicate this issue to them.

Ardron, Sergeant Brian D.	425th Brigade Special Troops Battalion, 25th Infantry Division	Fort Richardson, Alaska
Beadles, Specialist Jason J.	887th Engineer Company, 326th Engineer Battalion	Fort Campbell, Kentucky
Burge, Staff Sergeant Jerry C.	8th Cavalry Regiment, 1st Cavalry Division	Fort Hood, Texas
Davis, Specialist Michael W.	425th Brigade Special Troops Battalion, 25th Infantry Division	Fort Richardson, Alaska
Franklin, Private First Class Michael W.	44th Engineer Battalion, 2d Infantry Division	Camp Howze, Korea
Grothe, Specialist Kelly B.	Bravo Company, 321st Engineer Battalion	Hayden Lake, Idaho
Jones, First Lieutenant Ryan P.	4th Brigade Special Troops Battalion, 1st Infantry Division	Fort Riley, Kansas
Liggett, Private First Class Robert A.	2d Battalion, 69th Armor Regiment, 3d Infantry Division	Fort Benning, Georgia
McDonald, Specialist Sean K.	9th Engineer Battalion, 1st Infantry Division	Wiesbaden, Germany
Schwab, Staff Sergeant Coby G.	Bravo Company, 321st Engineer Battalion	Hayden Lake, Idaho
Smallwood, Specialist Erich S.	Alpha Company, 875th Engineer Battalion	Marked Tree, Arkansas
Sunsin-Pineda, Specialist Astor A.	4th Brigade Special Troops Battalion, 1st Infantry Division	Fort Riley, Kansas
Weaver, Staff Sergeant Shannon V.	425th Brigade Special Troops Battalion, 25th Infantry Division	Fort Richardson, Alaska

Rethinking How We Train



By Captain Nils N. French

When organizations are faced with an overwhelming quantity of *what* must be done, sometimes there's little time to consider *how* it must be done. This article focuses on the *how,* suggesting new approaches to the way future engineer leaders are trained. The article doesn't imply that these methods aren't currently being applied, and the author acknowledges having already witnessed their application. Chances are, however, that some of the ideas are new and will thus be of value. It is also realized that there may be valid reasons why the methods cannot be applied—whether related to logistics or the aims of training in general. Lastly, these ideas are not original to the author, but a compendium of the suggestions of others.

Training for the 21st Century

Yale University graduates Claudia Wallis and Sonja Steptoe coauthored a *TIME* magazine article titled "How to Bring Our Schools Out of the 20th Century."[1] The respected journalistic researchers in the field of education and learning believe that a chasm exists between most schools and the real world. The outside world has changed, but inside the schools of America much is as it was 100 years ago (desks, pens, notes, and students listening to teachers for hours). The authors suggest that students should be taught differently to develop "21st century skills"—broadly grouped into teamwork, information, and thinking skills.

Teamwork Skills

Most innovations today are made by groups, not individuals, increasing the importance of teamwork skills. Wallis and Steptoe draw this from the experience of former Lockheed Martin CEO Norman Augustine, who notes that there is a need to emphasize communication skills, the ability to work in teams, and the ability to work with different cultures. Students must collaborate and solve problems in small groups and apply learning to real-world scenarios (which results in better learning than the "chalk-and-talk" approach). The pertinence to the military is obvious; leaders must solve problems in group settings from corps-level staffs down to platoon and squad levels. Much of our training is already approached in this way.

Information Skills

These skills comprise the next essential skill set for the 21st century. Karen Bruett, Director of Education of the Partnership for 21st Century Skills, a leading advocacy group that draws from the expertise of educators and business leaders, notes that the 21st century has brought an overflow of information and a proliferation of the media that forces us to separate the reliable from the unreliable. Students must rapidly process and learn to manage, interpret, validate, and act on new information. The ability to judge objectivity and carefully assess *what* is known and *how* it is known is becoming critical. We notice the same overflow of information and resultant need for judgment in our tactical operations centers and headquarters as the number of sensors and sources on the battlefield increase steadily with the pace of technology. This increase in the amount of information available also means that information that was previously memorized is now readily available electronically, enabling a shift from memorization to a more solid understanding of the fundamentals that permit the understanding of complex concepts.

Thinking Skills

Wallis and Steptoe indicate that the approach to thinking skills must change as well. They note that the modern world has put a premium on creativity and innovation, and students must learn to see patterns where other people only see chaos—similar to the application to pattern analysis in the improvised explosive device (IED) fight. In essence, the ability to solve abstract problems is vital. To train in this capacity, it is essential that the curriculum dwell on key concepts that are taught in depth and in careful sequence while avoiding a deluge of forgettable details as is "so often served in U.S. classrooms." Students must develop portable skills: critical thinking, cross-discipline thinking, the ability to make connections between ideas, and the ability to keep learning.

Training for the Contemporary Operating Environment

A monograph titled "Teaching Maneuver Warfare"[2] by retired United States Marine Corps Colonel Michael Duncan Wyly, a former Vice President of the Marine Corps University, suggests that styles of fighting have changed and styles of teaching must therefore change as well. Old doctrine called for centrally controlled, closely orchestrated, slow-moving battles, and training was done in much the same way. Now we face a fast-paced, loosely controlled, decentralized fight where we must be responsive to a changing situation. How we train the force must shift accordingly. The teaching style must adapt to become less controlled and highly responsive.

Wyly proposes that the central focus in training should be to equip future leaders to make decisions. This is one of the rare qualities sought in combat leaders, since the ability to make decisions determines mission success in the contemporary operating environment (COE). Wyly stresses that this ability must be focused on more than content, methodology, or procedures.

To accomplish this, several methods are given. Historical and hypothetical case studies, graded classroom discussion of assigned reading, and terrain walks are suggested. Wyly notes that instructors can give students exercises with varying situations where limited knowledge of the terrain and the enemy must be considered in a fixed amount of time and students then clearly express their decided intent in a brief order. Definitions, procedures, and weapons capabilities must be narrowed down to the essential and put into a useful printed form so they can be learned through hands-on experience. The focus of the instructor must be on the decisive action that the COE demands.

Training for Adult Students

Special considerations must be made for adult students. The National Victim Assistance Agency (NVAA), which manages a comprehensive nationwide curriculum for adult students, highlights these considerations in a publication titled "The Ultimate Adult Educator."[3] Their suggestions are specific and based on the NVAA's extensive experience and research in the field of adult learning.

When teaching adults, the key consideration is that they must be in charge of their own learning. Instructors do not have the ability to implant ideas and skills in adult students' minds. They can only suggest and guide them, and their main role is thus managing the process through which the adult students learn, encouraging them to use their own judgment and decision-making capabilities. Adults are more likely to accept and absorb learning if they arrive at the idea themselves. Knowing this, the practice of giving adult students information to memorize must be discarded and activities that allow students to generate concepts and ideas must be used instead.

Furthermore, adult students respond better when material is presented through a variety of instructional methods, as opposed to a single, repeated style (Microsoft PowerPoint® is a possible example). As with younger students, adults learn best by doing. Different from younger students, adults are best motivated to learn *when they need to know,* and instructors must help them ask themselves why they need the information, how they can use it, and how they will benefit from it. These unique considerations are important, although they are not necessarily obvious, and their application is vital when dealing with adult students.

Conclusion

Several interesting points have been raised during this study. The first common thread that emerges is the need to focus on critical thinking and decision making. It is clear that this should be learned through application to scenarios in a team setting. Furthermore, there is a pronounced requirement to shift away from both memorization and tightly controlled, centralized instruction. Research suggests that students should be encouraged to take charge of their own learning as opposed to being given everything they need to know by their instructors. Again, much of our training is already conducted in a way that is in line with these suggestions. The difficulty will come in changing the training that is not.

Captain French is a Canadian Army Exchange Instructor assigned to the 554th Engineer Battalion, Directorate of Training and Leader Development, United States Army Engineer School, Fort Leonard Wood, Missouri. He is the primary instructor for Basic Officer Leader Course (BOLC) Phase III Task Force Engineer training and was recently involved in an extensive restructuring of the module that teaches the subject.

Endnotes

[1] Sonja Steptoe and Claudia Wallis, "How to Bring Our Schools Out of the 20th Century," *TIME*, 18 December 2006, pp. 50-56.

[2] Michael Duncan Wyly, "Teaching Maneuver Warfare," in Richard D. Hooker, Jr. (ed.), *Maneuver Warfare: An Anthology*, Presidio Press, Novato, California, 1993, pp. 248-264.

[3] Christine Edmunds, Kip Lowe, Morna Murray, and Anne Seymour, "The Ultimate Adult Educator: Achieving Maximum Adult Learning Through Training and Instruction," June 2002, *<http://www.ojp.usdoj.gov/ovc/assist/educator/welcome.html>*, accessed on 9 January 2007.

Historic Quad Buildings Renovated

By Ms. Aiko Brum

During a three-year renovation project beginning in 2004, contractors restored historic C Quad at Schofield Barracks, Hawaii, to its original architectural design at the turn of the century, complete with period colors and double-cased windows. Due to being included on the National Register of Historic Places, the exterior of the buildings in C Quad remains unchanged, while the interiors were renovated to meet the current Army standards. C Quad—now home to a full-size gym and basketball court, a company-level conference room, and the latest amenities for Soldiers living in the barracks—awaits the return of 2d Battalion, 35th Infantry Regiment, 3rd Infantry Brigade Combat Team, from Operation Iraqi Freedom.

Built during the 1915 to 1918 timeframe, C Quad was part of a large building campaign that focused on infantry regiments. The configuration of four buildings surrounding a central courtyard forms the concept of the "quad." Two of the buildings were barracks and the other two housed administrative offices. Like its contemporaries, C Quad consists of some of the earliest concrete-paneled buildings constructed in Hawaii. The buildings look much as they did on 7 December 1941, when the Japanese attacked Wheeler Army Airfield, or in 1953, when they were the filming site for the movie version of "From Here to Eternity." Because of the renovations, the history of this quad will live on.

The quad concept required preparing the design and construction of the four, three-story concrete buildings to include living quarters, community activities, company operations, battalion headquarters, and dining facilities. Demolition and renovation of these historical buildings had to comply with the National Historic Preservation Act.

In addition, the Army's Whole Barracks Renewal Program requires transformation of facilities to comply with 21st century building codes and antiterrorism and force protection standards. The mandate greatly challenges installation commanders, because it requires that barracks designed for high-volume occupancy be converted into suites. For example, the two C Quad barracks once housed 1,500 Soldiers. Now, 36 single-occupant and 132 one-plus-one rooms (2 private bedrooms with shared living areas) will house junior enlisted Soldiers and noncommissioned officers for a total of 300 Soldiers.

Original C Quad interior

The suites feature separate bedrooms and a common bathroom with a sink, toilet, and tub-shower and a kitchen with a full-size refrigerator, range, and microwave oven. Each barracks floor also contains a dayroom, which is a common entertainment or recreational area.

In total, C Quad required renovation of 288,000 square feet of facilities. The two barracks were gutted down to their slabs, and then recreated by contractors. All exterior utilities and pavement were replaced, and the center courtyard was restored.

In spite of modifications, the project was able to maintain its heritage and historical features and stay true to historic designs. The quad provides facilities for five company

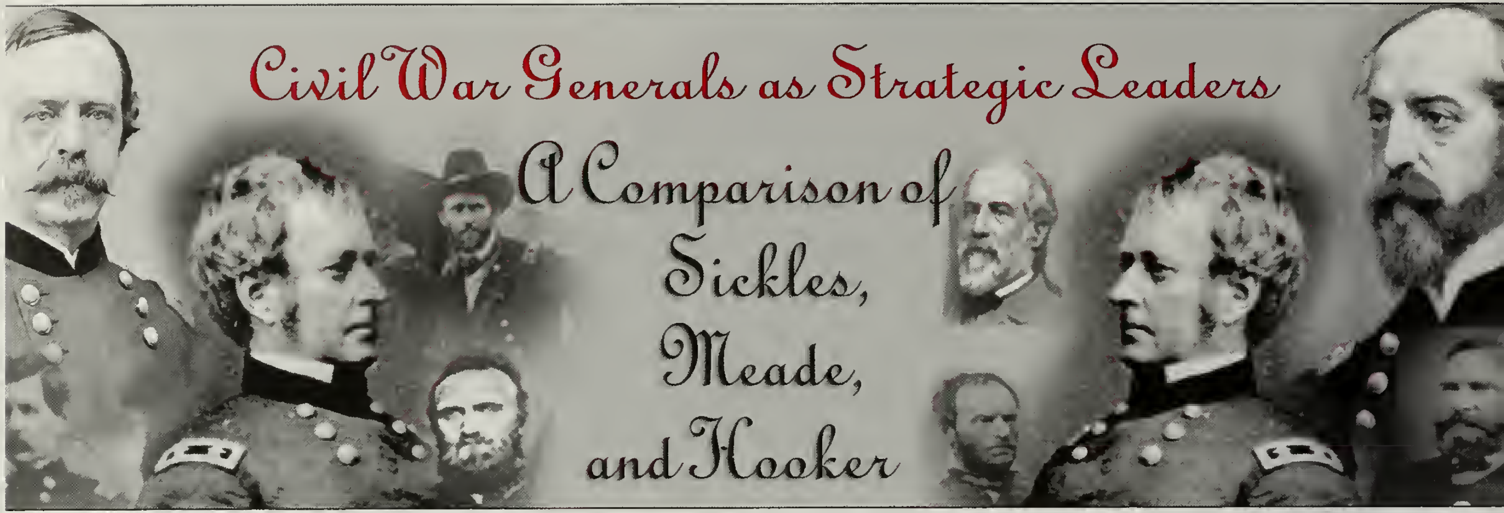
Original C Quad barracks

Newly renovated C Quad and courtyard

headquarters, to include a supply area, arms rooms, and company offices, as well as the battalion headquarters building with a state-of-the-art dining facility, battalion administrative and headquarters offices, and a consolidated Soldiers' lounge. The facilities have the most up-to-date communications, safety, and security systems.

A $58 million, 400,000 man-hour project, C Quad is one of a series in barracks renewal projects that will provide Soldiers stationed in Hawaii with "a quality of life commensurate with the quality of service" they provide. Three out of five historical quads at Schofield Barracks are now available for occupancy or are in progress. Next year, four more will begin renovations: two at Schofield Barracks, one at Fort Shafter, and one at Wheeler Army Airfield.

Ms. Brum is the Chief, Command Information, and managing editor of the Hawaii Army Weekly, Schofield Barracks, Hawaii.



Civil War Generals as Strategic Leaders
A Comparison of Sickles, Meade, and Hooker

By Dr. Richard Swain

A longer version of this article was submitted toward the requirements of a Master of Strategic Studies degree at the United States Army War College in April 2005. The views expressed in the article are those of the author and do not necessarily reflect the official policy or positions of the Army, the Department of Defense, or the U.S. government.

* * *

The strategic leadership tasks listed in Field Manual (FM) 22-100, *Army Leadership*, are really broad concepts. (The same concepts also are in FM 6-22, *Army Leadership*, which replaced FM 22-100 in October 2006.)[1] This article will consider the following broad strategic leadership tasks:

- Provide vision
- Shape the culture
- Manage joint, combined, and interagency relationships
- Manage national-level relationships
- Represent the organization
- Lead
- Manage change

Do these concepts apply to the past as well as the future? A valid concept is defined as *"an abstract or symbolic tag that attempts to capture the essence of reality. The 'concept' is later converted into variables to be measured."*[2] These strategic leadership tasks can be used to analyze the leadership of past Army leaders. They enable students of strategy to "capture the essence of reality," to look back and compare leaders, and thus gain insights into our own strategic leadership. This article compares the performance of three Union Army generals as strategic leaders in the Civil War: Major Generals Daniel E. Sickles, George G. Meade, and Joseph Hooker.

These strategic leadership tasks are doctrinally relevant to contemporary warfare, especially the strategic challenge of managing joint, combined, and interagency relationships. For the Army of the Potomac, interagency relationships were different, but no less important. The connection between current doctrine and historical situations may be tenuous, but it can also yield worthwhile insights into issues of strategic leadership.

Provide Vision

"The strategic leader's vision provides the ultimate sense of purpose, direction, and motivation for everyone in the organization. It is at once the starting point for developing specific goals and plans, a yardstick for measuring what the organization accomplishes, and a check on organizational values. Ordinarily, a strategic leader's vision for the organization may have a time horizon of years, or even decades. In combat, the horizon is much closer, but strategic leaders still focus far beyond the immediate actions."[3]

The time horizon for Sickles, Meade, and Hooker extended over weeks and months, not years. During the Civil War, general officers were wounded and killed at a rate 50 percent greater than that of ordinary Soldiers. Therefore, the ability to provide vision over the long term was limited. Even so, each leader provided some vision to his command. Sickles was in command of the 3d Corps of the Army of the Potomac from February to July 1863; Meade had command of the Army of the Potomac from 28 June 1863 until 27 June 1865; and Hooker had from January to June 1863 to provide the Army of the Potomac his vision.

Sickles' pragmatic approach and political acumen far outmatched those of others in the Army. The clique of West Point officers considered him a "political general," given command despite his lack of experience. This determination of amateur and professional Soldier was quite flimsy, since corps and army command was unknown to the senior leaders in the Civil War. The only officer with experience in corps or army command was Major General Winfield Scott; however, Scott had commanded fewer than 12,000 men in Mexico. Sickles' 3d Corps fielded 11,924 Soldiers on 2 July 1863, down from the 39,000 at the beginning of the war. An example of Sickles' vision can be seen in his first meeting with President Abraham Lincoln. Sickles was frustrated in his efforts to raise his regiment in 1861, since the Republican governor of New York refused to muster in Sickles' Democratic volunteers. Sickles then went to Washington and presented his argument to President Lincoln and Secretary of War Simon Cameron, who agreed to a new category of Soldiers—United States Volunteers. Sickles outmaneuvered the governor of New York and was given a commission. He was also the only amateur who stayed in the Army at the close of hostilities, serving as the ambassador to Spain during President Ulysses S. Grant's administration.

Meade's vision for the Army could be seen in his trust in a subordinate. Meade gave command of one wing of the Army to Major General John Reynolds, who had been captured at the same Battle of Glendale, Virginia, in which Meade was severely wounded. Reynolds returned to the Army after his parole, and Meade entrusted him (a fellow Pennsylvanian) with half of the Army of the Potomac. With only three days in command before Gettysburg, Meade was Lincoln's second choice to command the Army. Reynolds had been Lincoln's first choice, but he turned Lincoln down because of the untenable command relationship between the Army and the White House. In the preceding three years, the Army of the Potomac had four commanders—Brigadier General Irvin McDowell and Major Generals George McClellan, Ambrose Burnside, and Joseph Hooker. The level of trust between the commander in chief and his generals was low.

Meade was thrust into a command that he felt obligated to assume. The order to take command reached him at 0300 as the Army of the Potomac was on the move, tracking the second invasion of the North by the Army of Northern Virginia. Meade's decision to entrust a subordinate changed the direction of senior leader relationships in the Army of the Potomac. This provided a sense of direction, purpose, and motivation for the Army.

Meade's strategic vision was simply to eject the invaders from his home state. The victory message he sent to the Army of the Potomac after Gettysburg included a phrase about removing the invaders from "our soil." But Lincoln was absolutely aghast at the phrase and reprimanded Meade; Lincoln believed that "our soil" should refer to all the soil, both Confederate and Union. Meade's oversight revealed his lack of strategic vision regarding national objectives and goals. He was misrepresented in the press because of his treatment of journalists in his headquarters. He regarded them as a hindrance to his goals, rather than a means of reinforcing the national goals of the war.

> "Sickles' pragmatic approach and political acumen far outmatched those of others in the Army."

Hooker is described in biographies as a braggart, a drinker, and a womanizer who rewarded his friends with high command. One of his initial moves was to place Sickles in command of the 3d Corps, an appointment that overlooked the more senior Major General Oliver Howard. But why would Hooker promote Sickles over Howard? The character of the two men could not have been more different. Howard was a devout Christian who prayed over his men and passed out religious tracts in the hospital. Sickles was a pragmatic, hard-drinking womanizer who fit into Hooker's command climate and vision. Hooker

Major General Daniel E. Sickles

Major General George G. Meade

gave Howard command of the 11th Corps after the resignation of Major General Franz Sigel, who was upset at Hooker's promotion over him. The 11th Corps was made up of mostly hard-drinking German immigrants who had escaped religious oppression back home. Hooker may have intended to put the priggish Howard in a no-win situation by making him the leader of such a rowdy corps. Certainly morale in the corps suffered, which could explain the 11th Corps debacle at Chancellorsville. Hooker seemed to lack vision in placing senior leaders in these commands.

Shape the Culture

"Strategic leaders inspire great effort. To mold morale and motivate the entire Army, strategic leaders cultivate a challenging, supportive, and respectful environment for Soldiers and [Department of the Army] civilians to operate in. An institution with a history has a mature, well-established culture—a shared set of values and assumptions that members hold about it. At the same time, large and complex institutions like the Army are diverse; they have many subcultures, such as those that exist in the civilian and reserve components, heavy and light forces, and special operations forces. Gender, ethnic, religious, occupational, and regional differences also define groups within the force."[4] Sickles, Meade, and Hooker were all challenged to shape strong cultures in their commands.

Sickles was well respected by his men. Decisive and brave, he could shape and motivate his portion of the Army. However, he was quick to blame others for failure. He believed his actions on the second day at Gettysburg won the battle. He was evacuated to the rear after his leg was amputated by an artillery round in the vicinity of the Peach Orchard, and he quickly gave the press his account of his corps's action. He then preempted critics and used his influence in Congress and in the press to undercut Meade. Sickles' account to the Joint Committee on the Conduct of the War directly countered Meade's account of the Battle of Gettysburg. The West Point clique regarded Sickles as a loose cannon. Major General Henry Halleck's statement sums up the opinion of the West Point clique that political generals were "simply murder" and responsible for Union failures in the beginning of the war. Congress was critical of the West Pointers' efforts to blame nonprofessional Soldiers for the Army's poor performance. Instead, Congress and the newspapers placed the blame on the incompetence of the West Pointers. The ensuing culture of animosity between the militia officer corps and the Regular Army officer corps is still evident to this day. After the war, the dominance of either the militia system or the professional army would shape Army culture. Sickles was a charismatic, pragmatic political operator, but an amateur Soldier in the eyes of the West Point officers. His apparent success made the argument more difficult. Could a political figure lead a corps or division just as readily as a trained professional officer? Sickles proved that a charismatic political leader could.

Meade shaped the culture of the Army of the Potomac by his victory at Gettysburg. He had gained a reputation for being short-tempered and obstinate with junior officers and superiors alike, and he especially disdained civilians and newspapermen.[5] He believed that militia officers were incapable of leading corps and armies, and the testimony he gave to the Joint Committee on the Conduct of the War undercut Sickles' assertions and corrected misrepresentations of the facts of the Battle of Gettysburg. Meade's reputation was sullied by his testimony, but he retained the confidence of the commander, Lieutenant General Ulysses S. Grant. Grant's confidence in Meade and in the culture that he had created was probably one reason that Grant left him in command of the Army of the Potomac.

> "Meade shaped the culture of the Army of the Potomac by his victory at Gettysburg."

Hooker shaped a culture of political backstabbing. He undercut each of his commanders, yet he was able to create a positive relationship with Congress and the media. He supplied the media with information that would damage senior officers. The charges of insubordination that Burnside brought against Hooker after the Battle of Fredericksburg were most likely true. However, Lincoln relieved Burnside and placed Hooker in command of the Army of the Potomac, due in part to Hooker's political ability. Hooker believed in cronyism, and the system gave him loyal subordinates; however, it overlooked the professional skills and abilities of men who were not cronies. Hooker also shaped a culture of mistrust between himself and headquarters. Lincoln placed Halleck over Hooker, which probably led to Hooker's resignation. The message traffic between Hooker, Halleck, Secretary of War Edwin Stanton, and Lincoln—leading up to Hooker's resignation—offers an example of individuals talking past each other. Hooker could have shaped a culture that supported the administration if he had accepted Lincoln's invitation to meet on 13 June 1863. The meeting might have strengthened Hooker's relationship with the commander in chief before Lee's invasion. The rejection of Lincoln's request to meet seems to have sealed Hooker's fate.

"Hooker was confident in his ability to do a better job than those assigned to the command before him..."

Manage Joint, Combined, and Interagency Relationships

"Strategic leaders oversee the relationship between their organizations, as part of the nation's total defense force, and the national policy apparatus. They use their knowledge of how things work at the national and international levels to influence opinion and build consensus for the organization's missions, gathering support of diverse players to achieve their vision."[6] These Civil War leaders did not effectively establish the relationship between their organizations and the rest of the nation's total defense force.

Sickles did not build consensus within his corps. He ignored the advice of subordinates, peers, and superiors on the second day of Gettysburg, when he moved his corps into an exposed position—contrary to Meade's orders—and put the entire Army of the Potomac at risk. Sickles had no knowledge of how his action affected the total defense force, and his actions at Gettysburg exemplify poor strategic leadership. However, his actions after the war to make Gettysburg a national battlefield memorial offer a positive example of strategic leadership. His quest for battlefield preservation left a legacy that supports our nation's defense to this day.

Major General Joseph Hooker

Meade did build consensus among his senior officers around midnight of the first day of Gettysburg in the decision to stay and fight. However, he did not manage joint, combined, and interagency relationships very well. He failed to recognize the strategic objective of pursuing and destroying the Army of Northern Virginia after the battle and did not understand the strategic significance of trapping Lee's army north of the Potomac River. He did not recognize the relationship between his organization and the nation's total defense.

Hooker did not understand his comprehensive role as the commanding general of the Army of the Potomac and used the historical precedents of Burnside and McClellan to determine his role. He viewed his position as we now see a combatant commander—such as the commander of the United States

European Command or the United States Central Command—with a direct reporting responsibility to the Secretary of Defense and the President. After the Battle of Chancellorsville, Hooker was subordinate to Halleck. The following message specified his subordinate position:

> *WASHINGTON, June 16, 1863—10 p.m.*
>
> *Major General Hooker:*
>
> *To remove all misunderstanding, I now place you in the strict military relation to General Halleck of a commander of one of the armies to the general-in-chief of all the armies. I have not intended differently, but as it seems to be differently understood, I shall direct him to give you orders and you to obey them.*
>
> A. Lincoln

Hooker found this command relationship unacceptable, which resulted in his request for resignation.

Manage National-Level Relationships

"Strategic leaders identify military conditions necessary to satisfy political ends desired by America's civilian leadership. They must synchronize the efforts of the Army with those of the other services and government agencies to attain those conditions and achieve the end state envisioned by America's political leaders. To operate on the world stage, often in conjunction with allies, strategic leaders call on their international perspective and relationships with policy makers in other countries."[7] These Civil War leaders had little need to act on the world stage. However, they did have an obligation to meet the end state envisioned by America's political leaders.

Sickles was committed to the cause of suppressing the rebellion. His motivation may be seen as consistent with his self-aggrandizement. He needed a way to restart his political career after his murder of Barton Key, which resulted from Key's affair with Sickles' young wife. The temporary insanity defense so adeptly presented by his lawyer, future Secretary of War Edwin Stanton, saved Sickles from the gallows. But his forgiveness of his unfaithful wife outraged his political base. He needed to resurrect his political fortunes, and the war thrust him back into the limelight. He was able to operate on the national and international levels. His relationship with Lincoln, Stanton, Grant, and the Congress served him well through the war and beyond. He may have been a scoundrel acting only for his own benefit, but that does not necessarily detract from the service he performed for his nation.

Meade was a professional Soldier who placed Pennsylvania first and had difficulty pursuing the political ends desired by civilian leadership. Although he was obstinate with seniors, he accomplished difficult missions. His units were the only ones that broke the Confederate line at Fredericksburg, and he was the trusted second in command to Hooker at Antietam. Meade commanded the corps after Hooker was wounded at Antietam; however, Meade—the professional, no-nonsense Soldier—had a difficult time understanding the strategic intent of President Lincoln after the Battle of Gettysburg and failed to pursue and destroy the Army of Northern Virginia as Lincoln desperately desired.

Hooker was confident in his ability to do a better job than those assigned to the command before him, and he bragged that he could do it better than anyone else. This overconfidence spelled disaster for him at Chancellorsville, where he was unable to accomplish the ends designated by the political leadership. He did not seem to have a political affiliation, and Lincoln saw his nonpartisanship as an advantage when placing him in command. Perhaps after the debacles of McClellan and Burnside, Lincoln saw in this braggart someone who could bring about a victory. Some would say that Lincoln had few other choices in January 1863. McClellan had "the slows," and Burnside orchestrated the disaster at Fredericksburg. Hooker had bragged that he could whip "Bobby" Lee, but he was unable to carry out his boasts and achieve the end state envisioned by America's political leaders.

Represent the Organization

"Whether by nuance or overt presentation, strategic leaders vigorously and constantly represent who the Army is, what it's doing, and where it's going. The audience is the Army itself, as well as the rest of the world. There's an especially powerful responsibility to explain things to the American people, who support their Army with money and lives. Whether working with other branches of government, federal agencies, the media, other militaries, the other services, or their own organizations, strategic leaders rely increasingly on writing and public speaking (conferences and press briefings) to reinforce the Army's central messages. Because so much of this communication is directed at outside agencies, strategic leaders avoid parochial language and remain sensitive to the Army's image."[8] These Civil War leaders provide a message about the Army in the past. They present an image of a professional force being created in a republic that distrusted a standing military. These officers vigorously represented the Army to the nation.

Sickles exemplifies the long-term representation of the sacrifices that Union Soldiers made. He headed up the monument commission that preserved and honored the sacrifices of those who died in the conflict and was instrumental in preserving the Gettysburg battlefield. When Sickles was asked about a monument to himself, he replied that the entire battlefield was a monument to him. In many ways, that is an accurate statement. Sickles did provide a strategic representation of the Army to us and to our posterity.

Meade represented the Army well as the hero of Gettysburg. He continued to command the Army of the Potomac until the end of the war. He reinforced the Army's central message that a professional Army was needed by the nation and was promoted to the Regular Army rank of major general. Actions taken by Grant assured control of the Army to the professional Soldiers after the war, but Meade did not explain the Army story to civilians or newspapers since he had no patience with them.

Hooker is known to have structured the Army into separate corps with recognizable insignias, enabling it to join units from different states into cohesive, recognizable corps. His efforts were communicated within the Army and helped enhance its morale. His boasting and bravado provided the Army with confidence in its ability to defeat the Army of Northern Virginia. Even if the bravado was false, it communicated the confidence that the commanding general had in the Army he commanded. Hooker instilled considerable pride in the Army.

Lead and Manage Change

"Strategic leaders deal with change by being proactive, not reactive. They anticipate change even as they shield their organizations from unimportant and bothersome influences; they use the 'change-drivers' of technology, education, doctrine, equipment, and organization to control the direction and pace of change. Many agencies and corporations have 'futures' groups charged with thinking about tomorrow; strategic leaders and their advisory teams are the Army's 'futures people'."[9] These Civil War strategic leaders were caught by changing technology—especially the introduction of the rifled musket—that was not accompanied by the requisite change in doctrine and organization. The rifled musket provided a technology that challenged all the paradigms that these leaders believed, yet they remained wedded to the Napoleonic doctrine of warfare. Rather than dealing with the change by being proactive, they were reactive, and by the end of the war the era of trench warfare had begun. It was a solution forced on the strategic leaders in response to the withering lethality of a new weapon.

Conclusion

Sickles, Meade, and Hooker successfully carried out some of the strategic leadership tasks. It may be unfair to judge these 19th century leaders by a modern standard of strategic leadership tasks, because the atmosphere and environment in which they served were much different. During the Civil War, the Army was a small regular force filled out with militia. The professional West Pointers were both the heroes and heels of the war. In the beginning, Congress blamed the state of readiness on the nearest target—the professional Army. However, the Congress, whose responsibility is to provide for the common defense, was a major reason for those failures. Sickles, Meade, and Hooker offer interesting contrasts among strategic leaders. A pragmatic politician, an obstinate professional Soldier, and a backstabbing braggart all had an impact on what our Army became. We can learn from both the positive and negative examples of past strategic leaders such as these. Above all, we learn that strategic leadership is a difficult and complex enterprise.

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Title banner by Dr. Richard Swain.

Endnotes

[1] Field Manual 22-100, *Army Leadership*, 31 August 1999, pp. 7-8; accessed 23 April 2005.

[2] U.S. Environmental Protection Agency, "Program Evaluation Glossary," 2004; available from <*http://www.epa.gov/evaluate/glossary/c-esd.htm*>; accessed 23 April 2005.

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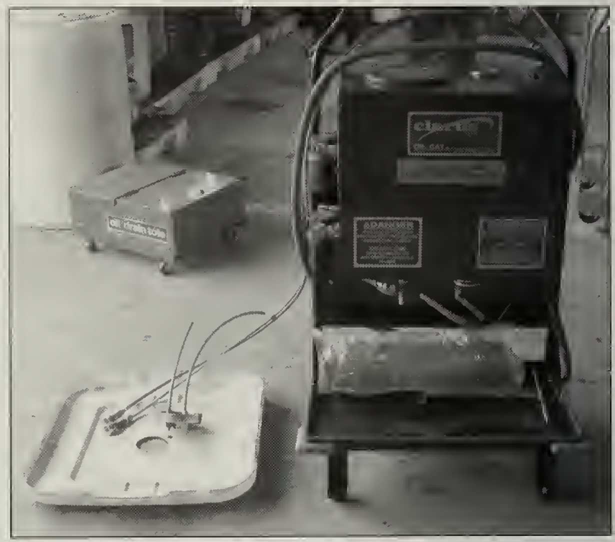
The Green Battalion

By Mr. Michael T. Wolford

The 58th Transportation Battalion at Fort Leonard Wood, Missouri, received official notification in April that it had won the Army Award for Maintenance Excellence for its category. Not only does the unit have a great maintenance program, it also embraces environmentally friendly technology that has saved thousands of dollars. The battalion uses several technologies to reduce operational costs while helping the environment: fuel-motor oil blending and battery and air filter reclamation.

The battalion uses a fuel-motor oil blending process to save on fuel and operating costs for handling and disposing of waste motor oil. The blending process, which mixes fuel with used motor oil that would otherwise be discarded, is simple and only occurs while a vehicle is being serviced. The blending system consists of the blending machine with filters, two fuel tank hoses, and an oil pan and hose. The mechanic uses the following steps to blend the fuel with the motor oil:

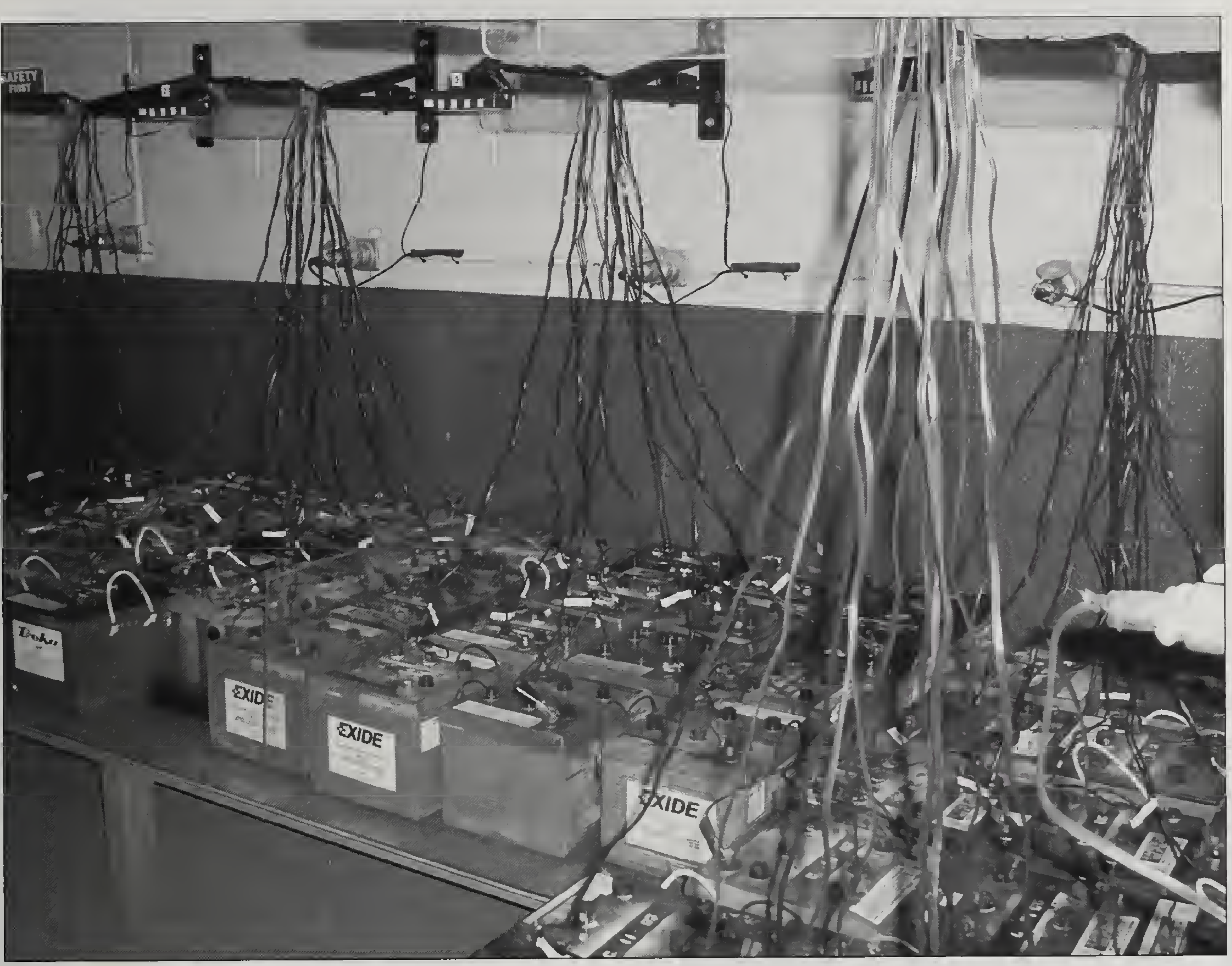
A maintenance worker for the 58th Transportation Battalion demonstrates the fuel-motor oil blending process.



Fuel-motor oil blending system

- Insert two hoses into the vehicle fuel tank. One hose delivers fuel to the blender, and the other delivers blended fuel back to the fuel tank.
- Place the oil pan under the vehicle's drain plug, and connect the hose to the blending machine.
- Drain motor oil into the oil pan.
- Turn the timer to the appropriate time, and turn on the machine.
- Continue with services while the machine blends the fuel and the used motor oil automatically.

In 2005, the first year the battalion mechanics blended fuel, they reused 771 gallons of motor oil. In 2006, they reused more than 2,500 gallons of motor oil. The unit realized a savings of over $7,200 in the first two years. This savings is mainly from the fuel the battalion did not have to buy, since each gallon of used motor oil blended equals a gallon of fuel. From an environmental point of view, this technology significantly reduces a waste stream.



Environmentally friendly technology, such as the vehicle battery recovery system, helps save resources.

The battalion has also increased operational efficiency by recovering its dead vehicle batteries. Most of the dead batteries are unusable because the battery plates collect a lead sulfate buildup that prevents the battery from accepting a charge. The battalion has acquired a recharging system that recovers dead batteries by removing the lead sulfate deposits and then recharging the batteries. Each system costs about $250, recovers 12 batteries at a time, and takes approximately 48 hours to charge the batteries. The battalion turned in 373 batteries to the Directorate of Logistics (DOL) from July to November 2006. DOL considered 142 of those batteries to be "bad," meaning they would not accept a charge. The remaining 231 batteries were charged by DOL and returned to the battalion. Once the battalion's recharging system was in place, the number of batteries turned in to DOL dropped by more than two thirds to 103. Of those 103 batteries, 90 were coded as bad. The battalion's recharging technology has saved the unit over $9,000 in replacement costs and inventory reduction in just five months. The unit has promoted sustainable systems and helped the environment by keeping more than 270 batteries in use.

Finally, the battalion recycles its air filters by sending them to a private firm in nearby Rolla, Missouri, to be cleaned and reused. The filters are cheaper to clean than to replace, and the private firm can clean most air filters up to five times. Since January 2006, the battalion has saved over $2,500 by using this system.

The 58th Transportation Battalion has realized savings of over $18,000 in the past two years from three technologies that also promote sustainability and protect the environment. Fuel-motor oil blending and the battery recovery systems are technologies that can be used in deployed situations to divert waste streams to usable products. These technologies are reasonably priced, and the fuel-motor oil blender has a General Services Administration catalog number: GS-07F-0187M.

For more information concerning these technologies, e-mail <*michael.wolford1@us.army.mil*> or call 573-329-1927.

Mr. Wolford is an environmental training specialist for the Directorate of Environmental Integration at the United States Army Engineer School, Fort Leonard Wood, Missouri. He recently retired from the Army after more than 24 years of service. He holds a bachelor's in environmental science from Drury University, Springfield, Missouri, and a master's in environmental management from Webster University, St. Louis, Missouri.

Photo by Sergeant Jessica L. Sheldon

Engineer Training Benefits School

By Specialist Ruth McClary

Soldiers from the 875th Engineer Company, 505th Engineer Battalion, North Carolina Army National Guard, have been clearing topsoil for a future construction project at the University of North Carolina – Charlotte (UNCC) as training this year. A member of the unit who is an employee of UNCC helped organize the project. This was the unit's first engineering project since its return from Iraq in September 2006. The project is one example of how the North Carolina Army National Guard supports the community, no matter what the need.

Photo by Sergeant Jessica L. Sheldon

A hydraulic excavator fills one of the six 20-ton dump trucks on the project.

The engineers were tasked to transport 5,000 cubic yards of topsoil two miles to a dump site on the UNCC campus beginning in late April. They used six 20-ton dump trucks that rotated between two loading points to transport loads to the designated dump site. A D7 bulldozer whirled through the mound, loosening the soil for a hydraulic excavator operator to scoop up and drop into the dump trucks. Two of the trucks developed minor maintenance problems that were taken care of on the spot by the Soldiers of the maintenance section, who were armed with a portable toolbox and their trusty multitools. They categorize themselves as the "backbone of the unit," ready and willing to repair with care.

The 16 Soldiers on the site agreed that this project was good training, good for retention, and good for readiness redeployment. Honking the horn of a dump truck as UNCC students passed by waving and shouting support, one Soldier said that he is up for reenlistment and ready for another 6-year term. Serving in Iraq gave him a sense of overwhelming pride in his country, a feeling that is different from accomplishing tasks in the civilian sector. He felt he made a difference in the lives of the Iraqi people and is proud of the work his unit accomplishes on the home front, whether it's removing debris after a hurricane or moving soil at a state university.

Specialist McClary is assigned to the Public Affairs Office of the North Carolina Army National Guard.

ENGINEERS PAVE THE WAY FOR VICTORY

By Specialist Jon H. Arguello

Shortly before Soldiers from 3d Brigade Combat Team (BCT), 10th Mountain Division, handed over control of their area of operations to the unit due to replace them, engineers from 3d Platoon, Alpha Company, 3d Brigade Special Troops Battalion, 3d BCT, 10th Mountain Division, worked hard to ensure that the incoming Soldiers had decent accommodations and facilities.

Even though 3d Platoon had been at the forward operating base (FOB) for more than a year, there was still a lot of work for the sappers to do, inside and outside the base. Since defeating the Taliban is the most important job for the new unit, the engineers wanted to make a stable base so the new arrivals could do their job of clearing the way for a secure Afghanistan without worrying about facilities.

Photo by Specialist Jon H. Arguello

A combat engineer moves concertina wire to make room for an expanded air resupply area.

Facilitating the fight is a concept the commander of Alpha Company stands behind. The FOB is supporting many more Soldiers than it was set up for, so it has been expanded to house more people, and that includes changes in infrastructure.

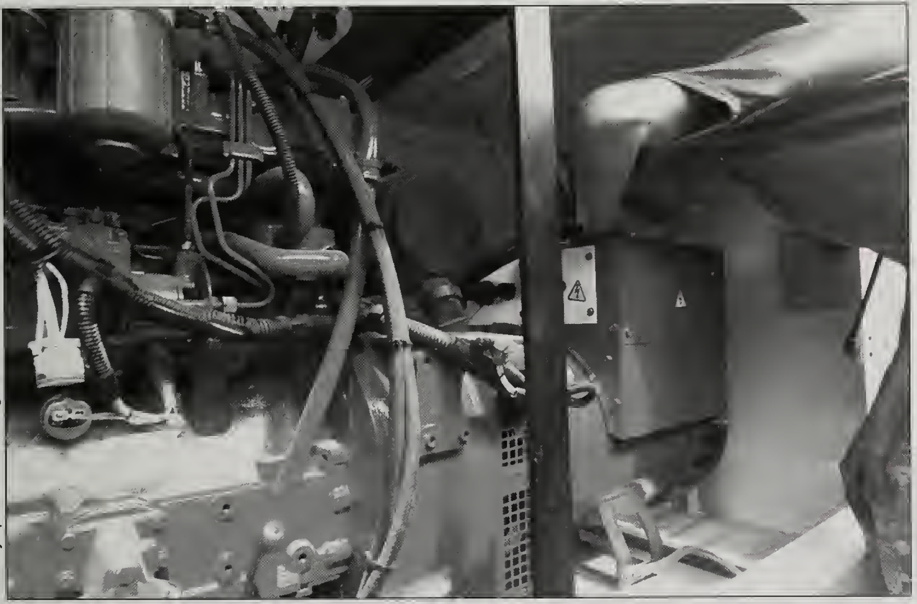


Photo by Specialist Jon H. Arguello

A Soldier fixes a generator during a power outage.

The expansion has also benefited the local population. Construction and base development brought an influx of jobs and business to the area, improving the local economy. The more legitimate money infused into the economy, the easier it is to move the local population away from the trade in illegal narcotics.

The dedication of the engineers to the mission—right up to their redeployment—was impressive. The purpose of the improvements and expansion was to ensure that the replacement Soldiers were set up for success, allowing them to start combat operations immediately instead of worrying about base camp construction. The members of 3d Platoon got their gratification from knowing that the Soldiers replacing them would be able to concentrate on the fight.

Specialist Arguello is a journalist with the 22d Mobile Public Affairs Detachment, Combined Joint Task Force-82.

18th Engineer Brigade Joins V Corps

By Specialist Sean C. Finch

While many United States Army Europe (USAREUR) units are drawing down in size or preparing to move back to the United States as the Army transforms its forces, USAREUR's 18th Engineer Brigade will spend the next year building its numbers in support of its new mission as a major subordinate unit of V Corps. The brigade was activated as part of USAREUR in 1942. It later relocated to Fort Leonard Wood, Missouri, but rejoined the USAREUR ranks when it moved to Karlsruhe, Germany, in early 1977. The 18th officially became a V Corps organization on 16 February 2007.

A HMMWV carrying Soldiers from Headquarters and Headquarters Company, 18th Engineer Brigade, makes its way through the town of Mokren, Bulgaria, during an exercise in summer 2004.

The Heidelberg-headquartered brigade is moving in to pick up the mission that has long rested on the shoulders of the 130th Engineer Brigade and its subordinate units. The 130th—based in Hanau, Germany—has served as the V Corps premier deployable engineer organization since 1969. While some of its units, such as the 54th Engineer Battalion and the 535th Engineer Battalion, will merge with the 18th, most of the 130th will return to the United States. That transition is scheduled to take place over the next year.

Because the 18th is the only engineer brigade left in theater, it will be responsible not only for V Corps but also for any mission that USAREUR needs it for. In addition to routine engineer tasks such as reconstruction of standing structures, the unit will also become capable of undertaking heavy combat engineer missions in peacetime environments, such as building roads, and during deployments, such as clearing thoroughfares of deadly improvised explosive devices (IEDs). *(In April 2006, the 18th completed a tour in Afghanistan in support of Operation Enduring Freedom, where it undertook missions in Bagram, Kandahar, Sarana, and other locations.)*

The unit may get involved in troop construction, because it has that capability. As an example, during the past few months it accomplished road work at the Hohenfels (Germany) Training Area. Other troop construction projects could include billeting and forward operating bases.

The Soldiers of the 18th will also tackle vertical construction missions such as buildings, bridges, and other structures that enhance unit training exercises. Construction during exercises is a valuable tool for continuing to train and retrain engineer Soldiers in a peacetime setting, for keeping those Soldiers up to date on new building technologies, and for assessing the capabilities of new engineers.

Specialist Finch is a member of the V Corps Public Affairs Office staff.

Book Reviews

Learning to Eat Soup with a Knife: Counterinsurgency Lessons from Malaya and Vietnam, by John A. Nagl. The University of Chicago Press: Chicago, Ill., 2002; rpt. 2005, 249 pages, ISBN 0-226-56770-2, $17.00 (paper).

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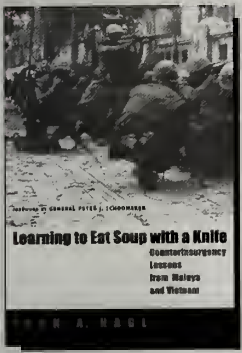
Foreword by General Peter J. Schoomaker
Learning to Eat Soup with a Knife
Counterinsurgency Lessons from Malaya and Vietnam
John A. Nagl

"What does Nagl propose that is any different than Galula, Trinquier, or any of the other classic authors of counterinsurgency warfare?" was the question a recent graduate of the Command and General Staff College posed to me after I had spent an evening reading this book whose title, quoted from T.E. Lawrence, describes the slow and messy nature of counterinsurgency operations.

That was a fair question because as many students of counterinsurgency are aware, these works often present overarching concepts (such as legitimacy, commitment, intelligence) and then leave the reader struggling to draw his own conclusions on how they may be applied to a given contemporary military operation.

However, I found an answer to the question in Nagl's premise that it is in the processes, not the concepts, where one finds the key to defeating insurgencies. Nagl supports this premise by offering the reader a process used throughout the book to examine the decisions and actions taken or not taken by militaries in their effort to become counterinsurgency learning organizations.

If the use of a systemic, iterative, organizational learning process like the one Nagl employs sounds familiar, it should. Two recent Combined Arms Center and Fort Leavenworth commanding generals have forwarded a similar construct called "The Engine of Change" that is being put to use throughout our Army to support coalition counterinsurgency operations in Afghanistan and Iraq.

Specifically, military engineers may find Nagl's work particularly familiar because it allows for structured thought while examining emerging counterinsurgency doctrine. After introducing the reader with his methodology in the early chapters, Nagl demonstrates how it can be applied to analyze the development of counterinsurgency doctrine and practice during the British Malayan Emergency from 1948 to 1960 and again with the doctrine the United States developed in the Vietnam War from 1950 to 1975.

At the conclusion of the Malayan Emergency and Vietnam War analyses, Nagl leaves the reader well positioned to personalize and apply this approach for immediate use in military transition teams, provincial reconstruction teams, and full-spectrum operations.

Reviewed by Lieutenant Colonel Paul B. Olsen, P.E., Speechwriter to the Commanding General, Combined Arms Center and Fort Leavenworth, Fort Leavenworth, Kansas.

Looking for a Hero: Staff Sergeant Joe Ronnie Hooper and the Vietnam War, by Peter Maslowski and Don Winslow, University of Nebraska Press: Lincoln, 2004, 618 pages, ISBN 0-8032-3244-6, $29.95 (hardcover).

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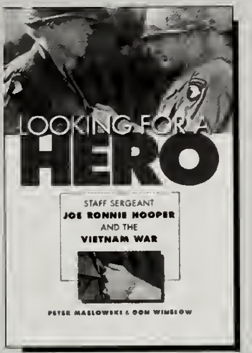
LOOKING FOR A HERO
STAFF SERGEANT JOE RONNIE HOOPER AND THE VIETNAM WAR
PETER MASLOWSKI & DON WINSLOW

This book covers the tragic life of Staff Sergeant Joe Ronnie Hooper, arguably the most decorated soldier of the Vietnam War. In addition to two Silver Stars, six Bronze Stars, and eight Purple Hearts, he was presented the Medal of Honor for actions near Hue in February 1968. At the time, he was assigned to Delta Company, 2d Battalion, 501st Infantry, 101st Airborne Division.

Looking for a Hero takes you through Hooper's life and military career, as well as discusses the Vietnam War itself. Although this book contains detailed and valuable information about the war, it does have a biased tone and does not lend itself to being an objective source for learning about the Vietnam War. But Maslowski and Winslow's extreme thoroughness in telling Hooper's story offsets their antimilitary bias and makes their work a more than respectable contribution to the Vietnam War literature. At times, the book seems to be more about the war than about Hooper. But in many ways, Hooper serves as a symbol for that conflict; his life had so many highs and lows, paralleling the upheavals in American society during the war.

Looking for a Hero gives you the objective truth about Joe Hooper's life and leaves you either respecting him or disliking him. Every Medal of Honor recipient is a hero; but some, like Hooper, are not saints. What this book does is show you that all heroes are human, and the events that made them heroes become quite a heavy load to carry.

The sad part of Hooper's life, as with many veterans of the Vietnam War, was the post-traumatic stress disorder that he suffered from. Neither Hooper nor American society knew how to handle the problems that grew out of this. The combination of drugs and/or alcohol added to the disorder for many veterans and often destroyed not only them but their families as well.

Hopefully, America has learned from the war in Vietnam and is preparing itself and facilities to help the veterans of the War on Terrorism deal with the horrors of war and the injuries they have sustained.

Reviewed by Mr. Jeffrey L. Rosemann, an instructional systems specialist with the Officers Training Development Division, Directorate of Training and Leader Development, United States Army Engineer School, Fort Leonard Wood, Missouri. A retired infantry Soldier, he also served as the 2d Infantry Division historian.

United States Army Engineer Regimental Colors

Scenes from ENFORCE 2007

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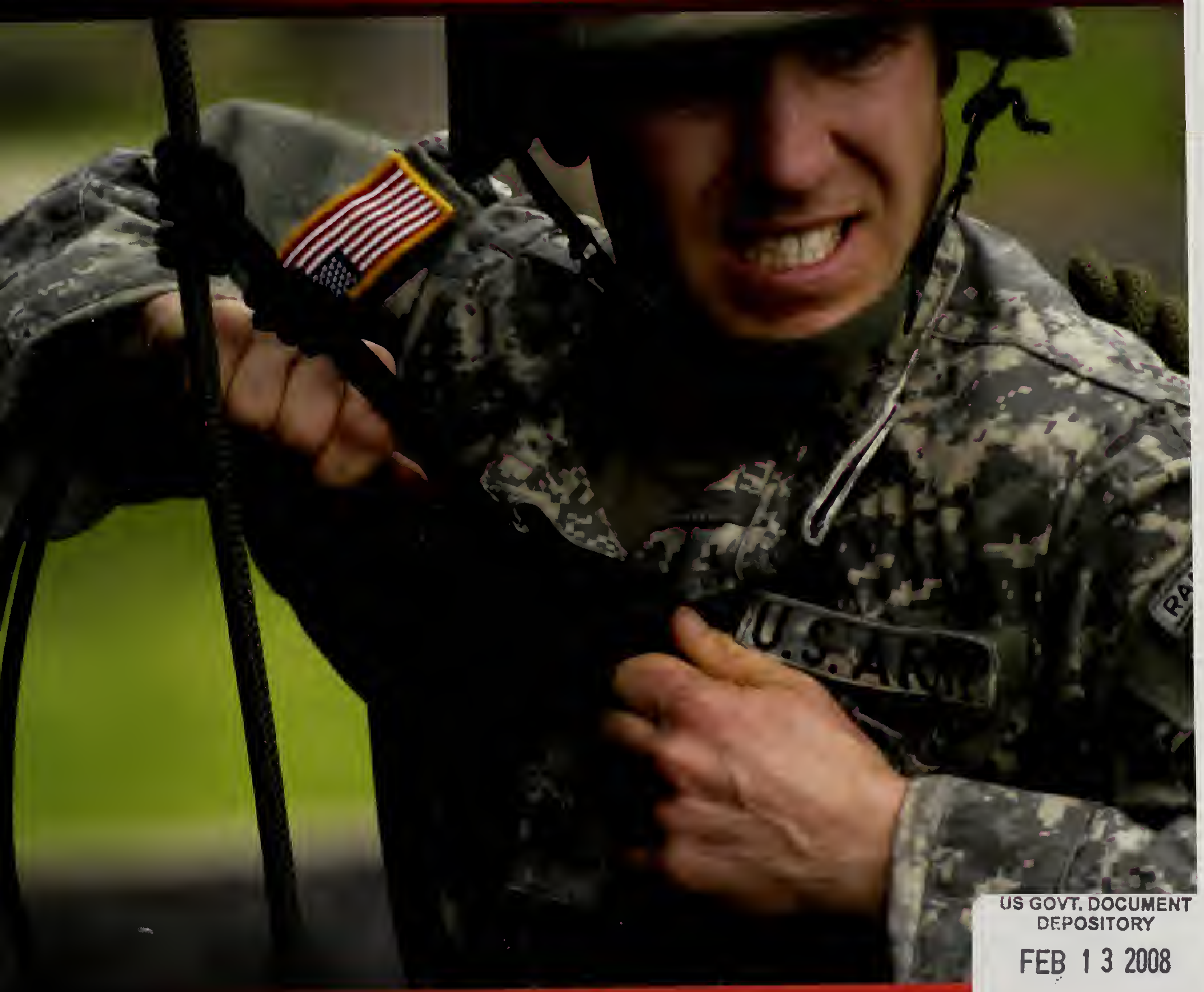

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ENGINEER

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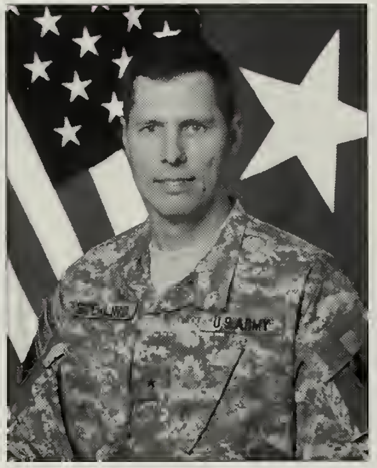
Clear The Way

By Brigadier General (P) John E. Sterling, Jr.
Commandant, United States Army Engineer School



As we prepare to begin another fiscal year—Army year that is—of continued remarkable, selfless, tireless, and courageous service and sacrifice to the Nation and our Army, summer transitions are nearly complete and our Army Families are back in the routine of another school year, many with their engineer Soldier deployed or deploying to war. Your leaders very much recognize and appreciate that the past five years have been immensely difficult, challenging, and stressful for all members of the engineer team. We are so incredibly blessed and grateful for your service and sacrifice. Together, we have endured, and will continue to endure, the challenges associated with this persistent War on Terrorism and commitment to achieve great successes in keeping with the ideals, freedoms, and liberties that make our country great.

We have had a great deal of senior leader transition in the Engineer School. We welcome the new Director of Training and Leader Development (DOTLD), COL Jerry Meyer, and his family. COL Dick Hornack has transitioned from the Capability Development and Integration Directorate (CDID) to the Director of the Counter Explosive Hazards Center (CEHC). Other new senior engineer leaders serving on the MANSCEN team include COL Thomas Kula, the Chief of Rapid Transition Division (RTD), and COL Pete Tabacchi, Director of CDID.

I am pleased to announce another great addition to the Fort Leonard Wood community, the Explosive Ordnance Clearance Agent (EOCA) Course. The EOCA team will move from Redstone Arsenal to Fort Leonard Wood in October, and the first course to be taught here is scheduled to begin on 26 November 2007. The EOCA Course, which is transitioning from 6 weeks to 4 weeks, will be located in the new CEHC facility. By moving the course to Fort Leonard Wood, units will realize a cost savings in TDY dollars. Instead of sending Soldiers to two locations, they can now come to only one and receive training on multiple disciplines.

Engineers are able to provide support as required, in accordance with the FRAGO published by MNC-I on 29 June 2007 allowing engineers to blow in place (BIP) confirmed IEDs under certain restrictions. CEHC offers several outstanding training opportunities that prepare Soldiers with current counter explosive hazards techniques and employment of contingency equipment. The Route Reconnaissance and Clearance Course–Sapper (R2C2–S) and Counter Explosive Hazards–Planning (CEH–P) are two key courses offered that instruct on the planning requirements and systems for executing counter explosive hazards operations (with emphasis on counter IEDs). Five courses are offered and are available via ATRRS. I strongly encourage leaders to maximize attendance at these courses aimed at defeating the greatest threat to our forces.

Safety is a matter of utmost importance, and it is personal to all members of our team. As an Army that conducts inherently dangerous operations on behalf of our Nation in training and at war, we continue to injure and lose great members of the team. Sadly, many of the injuries and deaths are preventable. Many occur off duty or are non-battle-related. In reading the many accident reports, the contributing causes of many of the injuries and deaths are quite upsetting and disturbing. It is unbelievable that an alarming percentage of Army Soldiers, Civilians, Families, and their loved ones don't use seatbelts regularly. It is an undisputable fact that seatbelt use is the top preventive measure for injuries and deaths in motor vehicle accidents. I highly encourage everyone to care enough about yourself, your Families, loved ones and friends to accept nothing less then 100% wear of seatbelts at all times. Your Army and Regiment care! Distracted driving caused principally by cell phone use is another alarming and growing trend. Seek alternatives and demand the same of your friends and Families, to include pulling over to use a cell phone if absolutely necessary or using approved hands-free devices. Lastly, excessive alcohol use remains a problem for our Army, which is exacerbated by those seeking alcohol to alleviate the stress on the force and Family. Excessive alcohol consumption mixed with any activity always results in serious consequences, personally and professionally.

In closing, I'd like to extend my appreciation for the adaptability, flexibility, and perseverance demonstrated by our engineer team to support the War on Terrorism. I ask for your patience and commitment as we ascend from the "trough" in transformation; we will reap the benefits of transformation, most notably over the next two fiscal years.

I appreciate your selfless support and sacrifices to the development of our Soldiers and leaders. Thank you for your service during this challenging and dynamic time in our history.

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

I would like to welcome you back to another great issue of the Engineer Professional Bulletin. This publication helps keep the Regiment informed on current and emerging developments and serves as a tool for enhancing your professional development.

Engineers everywhere are fully engaged in their heavy summer training schedules. Here at Fort Leonard Wood, the drill sergeants and cadre are busy with the annual surge of trainees who migrate with the civilian school cycles. And in our many Reserve and National Guard training areas, engineer units are conducting the annual training that provides their best opportunity of the year to gain collective competence in their mission-essential tasks. At Active Army posts, the normal hustle of training deployments and support is increased with Reserve augmentees, cadets in apprentice troop-leading roles, supporting Reserve unit training, and the surge of personnel turnover.

We continue our efforts to *Transform*, *Train*, and *Take Care of the Regiment.* I would like to highlight some changes going on in our Regiment now and some that will take place in the future. Congratulations to all the master sergeants who made the command sergeant major (CSM) list. This is one of the largest selection lists we have had. I know you will continue to display great leadership and to mentor Soldiers as they come up through the ranks. Two units have been added to the Engineer Regiment this past quarter: We activated the 8th Engineer Battalion at Fort Hood and stood up the 31st Engineer Battalion at Fort Leonard Wood.

NCOES: The Engineer Advanced Noncommissioned Officer Course is comprised of three courses: 21B/C Combat Engineer, 21H Construction Engineering Supervisor, and 21N Construction Equipment Supervisor. Commanders and CSMs, I need your assistance to ensure that all Soldiers who are selected for NCOES courses show up. We have had a significant number of no-shows the past two quarters, and we need to eliminate no-shows. NCOES courses are a very important part of our Soldier's promotion and career progression. In FY 2007 the 21 B/C courses graduated 172 students with 33 scheduled no-shows; the 21H course graduated 68 students with 9 scheduled no-shows; and the 21N course graduated 67 students with 7 scheduled no-shows. The projections for FY 2008 show 21 B/C with 183 students, 21H with 37 students and 21N with 30 students.

The Engineer Basic Noncommissioned Officers Course is working to implement the most current and relevant information available into the programs of instruction. This allows a training environment to keep pace with the current operating environment and its ever-evolving demands. Over the past year, we have trained in excess of 433 combat and construction engineers, and 41 construction equipment maintainers. In the future, we expect to maintain the highest levels of mental and physical toughness, which are essential to the continued success of the Regiment.

Modularity: Our Fusion Cell continues to work hard on our Regimental units and strength. Currently, the documented, approved MTOE is a consolidated 151-man engineer company residing in the brigade special troops battalion (BSTB). The current implementation plan is to have the companies convert from two companies in the combined arms battalion (CAB) to a consolidated company in the BSTB, based on the timeline that supports each individual brigade combat team (BCT). We are submitting a force design update (FDU), which has been approved by TRADOC, making two101-man companies residing in the CABs. In addition to the original 76-man engineer company, the joint assault bridge and assault breaching vehicle will be added. The personnel and equipment numbers haven't been worked out in depth, but the plus-up of personnel and equipment will fill gaps identified as shortfalls in the original heavy brigade combat team (HBCT) engineer companies. The FDU is being initiated and will be inserted in the Total Army Analysis (TAA) 10-15 cycle.

In closing, I am extremely proud of our Regiment's Soldiers for their contributions and positive impact over the past year. I am especially proud of the sappers who are deployed around the world in harm's way. To those who have paid the ultimate sacrifice in the cause of freedom, justice, and the American way of life, neither you nor your families will be forgotten.

God Bless America!

PLAN, BUILD, PROTECT: ASSISTING IRAQ!

By Major Joseph A. Snel

As the Multinational Corps–Iraq (MNC–I) corps engineer brigade headquarters, the Headquarters and Headquarters Company, 411th Engineer Brigade (Theater Army), provided proactive, timely, relevant, and essential command and control for more than 3,000 engineer Soldiers, Airmen, and Sailors throughout Iraq in support of Operation Iraqi Freedom. The brigade's mission included assured mobility, military construction, and geospatial engineering. The brigade headquarters also exercised administrative control for all United States Army engineer units operating in support of United States Marine Corps expeditionary forces in Multinational Force–West.

The brigade theme—*Plan, Build, Protect: Assisting Iraq!*—resounded in each and every endeavor across the theater of Iraq. The commander of the 411th Engineer Brigade challenged his Soldiers to "bring forward the leadership" shown during the mobilization's early stages. He then introduced the command message as the brigade received its mission from the 130th Engineer Brigade, the previous MNC–I theater engineer brigade:

The 411th Engineer Brigade is called to duty by our nation. We are clearing IEDs [improvised explosive devices] from the road systems to protect the coalition force's mobility within Iraq to allow the continued building of a free, independent Iraqi government. Army Strong!

The commander further explained the brigade's theme:

- *Plan:* Through initiative and innovation, the patriotic American service members of the 411th Engineer Brigade contribute their engineering skills to plan, design, and maintain critical lines of communication and force protection for coalition Soldiers, Airmen, Sailors, and Marines.
- *Build:* The 411th Engineer Brigade Service members aggressively execute the construction of logistical support platforms and force protection structures to sustain and protect coalition forces endeavoring to assist Iraq in building a free and independent nation.
- *Protect:* Through intelligence analysis, the clearing of IEDs from main supply routes (MSRs), and the construction of force protection measures, the 411th Engineer Brigade

Engineers place cement pads in preparation for surge forces.

Soldiers and Airmen build a tactical operations center for the 1st Cavalry Division.

service members protect the brave coalition forces dedicated to helping Iraq achieve its governmental goals.

Mobilization and Deployment

The 411th entered 2006 continuing with preparations for the unit's upcoming mobilization and deployment in support of Operation Iraqi Freedom. In January, the commander was selected as the next commanding general of the 99th Regional Readiness Command, and in March, he handed the reins of the 411th over to a new commander. Planning and coordination continued into the spring as the headquarters prepared for a four-phased mobilization.

In April, the first of four elements of the brigade headquarters mobilized. Soldiers from the brigade's construction management section (CMS) reclassified their military occupational specialty as technical engineers with six weeks of training at Camp Grafton, North Dakota. The CMS section had to be reconstituted after the original CMS section mobilized and deployed in 2004 with the 420th Engineer Brigade, which did not have an organic CMS section.

In May, the leaders mobilized for the reconnaissance/predeployment site survey (PDSS) to Iraq with the 130th Engineer Brigade. The PDSS allowed the staff to see firsthand where the brigade would operate and to meet the staff of the 130th. This survey allowed the staff to conduct detailed planning for assuming the mission and occupying the headquarters building. Following the PDSS, the leaders returned to Fort McCoy, Wisconsin, for continued mobilization training.

In June, Soldiers from the brigade's command group and representatives from the personnel; intelligence (G2); operations, plans, and training; logistics (G4); and communications sections and the CMS traveled to Fort Hood, Texas, to participate in the III Corps mission rehearsal exercise (MRX). The MRX brought together the corps's separate brigades, such as the 411th Engineer Brigade. Although the MRX did not involve the brigade staff in the exercise play, the staff used the time to develop situational awareness and staff products for use later in the deployment. The balance of the Headquarters and Headquarters Company later mobilized and deployed to Fort McCoy, where it conducted Soldier readiness processing and individual validation tasks.

September brought the movement from Kuwait into Iraq and the beginning of the relief in place/transfer of authority (RIP/TOA) with the 130th Engineer Brigade. On 19 September 2006, the authority, responsibility, and mission of the MNC–I corps engineer brigade passed to the 411th Engineer Brigade. By the end of that week, the 130th, an Active Army unit, had fully redeployed back to its home station in Germany, and the 411th Engineer Brigade officially had command and control of more than 3,000 Soldiers, Airmen, and Sailors across the theater. The span of command and control included Active Army, Reserve, and National Guard from the United States Army and United States Air Force. The brigade headquarters even had a Navy lieutenant commander attached to it.

The Mission

Assured Mobility

The brigade's assured mobility mission to ensure unimpeded traffic on the corps MSRs had five components:

- Route clearance—Locate and clear IEDs.
- Rapid crater repair—Fill previous blast holes and deny the enemy a favorite place to hide IEDs.
- Culvert denial—Block the openings of culverts to impede the enemy's ability to hide large amounts of explosives in the openings, causing massive road destruction when detonated.

- Route sanitation—Clear road shoulders and medians of debris and vegetation used to hide IEDs.
- Bridging—Repair or replace damaged bridges on critical routes.

Under the command and control of the brigade headquarters, the results of these efforts were phenomenal.

Route Clearance. As the corps engineer brigade, the 411th executed command and control of the 875th Engineer Battalion, which performed route clearance along the corps MSR. This mission was essential to ensure the uninterrupted flow of supply convoys throughout Iraq. The brigade's route clearance teams moved through the operating space of multiple brigade combat teams (BCTs) in a complex and dangerous environment.

The brigade headquarters was especially proactive in monitoring emerging enemy trends to ensure that teams were clearing IED hotspots during the enemy's preferred emplacement times. The results of this effort were exceptional. Twelve route clearance teams cleared more than 394,000 kilometers of roads with more than 1,344 IEDs found over a 12-month period. As a testament to the targeting effort the brigade staff directed, the 12 teams consistently found and cleared more than 59 percent of all IEDs on the routes for which they had responsibility. In addition to these regular missions, the brigade route clearance battalion was frequently called on to clear additional roadways for the BCTs in direct support of their combat operations.

Rapid Crater Repair. The brigade headquarters facilitated and synchronized rapid crater repair teams by using heavy engineer equipment from the two engineer battalions under its control to fill previous blast craters along critical routes. The teams dramatically reduced favorite enemy hiding places for IEDs by repairing more than 700 craters.

Culvert Denial. Once the enemy began placing explosives inside culverts to interfere with mobility on the MSR, the 411th began a process of denying access to these culverts throughout its area of operations. Its CMS developed a playbook of options for the various types of culverts found in Iraq. This playbook was adopted throughout the Iraqi theater of operations by other engineer units.

Route Sanitation. The final piece to keeping the MSR open is the route sanitation mission. By using engineer equipment to clear road shoulders of debris and vegetation, route sanitation teams made it harder for the enemy to conceal IEDs, which resulted in fewer lethal IEDs and increased success for route clearance teams. During the course of the year, more than 70 route sanitation patrols removed debris along 750 kilometers of routes north and south of Baghdad.

Bridging. As the higher headquarters for all military bridging assets in the MNC–I, the 411th provided a vital capability for the corps commander to respond to the damage or destruction of critical bridges anywhere in Iraq. In addition to this rapid response mission, the brigade conducted multiple bridging, rafting, and riverine operations. The brigade also provided military bridge emplacement and inspection training to the Iraqi army to develop a Mabey Compact 200® bridge capability.

Bridging operations included emplacement of Mabey bridges at six locations; repair of IED-damaged overbridges on four occasions; emplacement of an assault float bridge (AFB); repairs to an AFB on two occasions; and plans for the emplacement of an AFB bypass. Additionally, the brigade conducted continuous rafting operations across the Euphrates River for nearly 12 months, providing essential mobility support to both coalition forces and the local populace.

HESCO Bastion Concertainer® units surround an ammunition holding area.

Military Construction

The 411th exercised command and control for all echelon-above-division construction, design, and construction management units in Iraq. This joint force of Army and Air Force engineers was responsible for design, management, and execution of corps priority construction missions on and off major contingency operating bases (COBs) and smaller forward operating bases (FOBs).

The brigade's initial efforts in base camp design, construction, and master planning throughout Iraq were focused on the improvement of the COBs, the closure of smaller bases, and the movement of units there to larger enduring bases. The brigade made a complete turn halfway through its tour, when the president announced that additional BCTs would be sent to Iraq. With a joint force of Army and Air Force facilities and design engineers, the brigade played a central role in the corps requirement to bed-down an additional surge of Soldiers deployed to Iraq over a short time frame.

The brigade's facility engineers and designers worked closely with the area support groups to develop innovative ways to house and maintain these additional Soldiers and their equipment. In addition to already existing bases, the brigade CMS planned the construction of a new base in a remote area. With no existing infrastructure, the section used a variety of methods to create a base camp capable of housing Soldiers, contractors, and their equipment. While this new base camp was under construction, the CMS moved on to plan and design the bed-down of four additional BCTs on six separate FOBs.

Throughout the year, the four facility engineer teams, under the oversight of the CMS, continued to program and design improvements at the four major COBs. In addition to troop construction, these teams developed a military construction program. Regardless of the service or type of mission, the teams consistently performed to high standards and consistently exceeded the expectations of their customers.

Geospatial Engineering

The brigade provided timely and accurate geospatial engineer support to operations throughout Iraq through terrain analysis and map production. The brigade G2's topographic section completed more than 450 requests for information in support of the corps engineer priority route clearance and construction missions. By creating multiple special products, the section provided construction support for four combat teams with more than nine surge missions, including base camp buildups. The section was also instrumental in producing maps and imagery in support of the United States Army Defense Ammunition Center. Additionally, the section printed numerous imagery photo mosaics with range fans for the guard towers at a logistics support area, which greatly enhanced the situational awareness of the Soldiers maintaining security for that base.

Logistics Support

While mobilized and deployed in support of Operation Iraqi Freedom, the brigade G4 section developed a coherent team of Soldiers from different units who planned, coordinated, and executed the brigade's logistical requirements. This included managing and operating a construction material yard that procured and distributed construction materials in support of more than 200 projects and missions on all the major operating bases, three major surge projects, and more than 400,000 kilometers of route clearance and blast hole repair. This section also monitored the brigade's supply accountability system to ensure the maximum utilization of its equipment. It coordinated maintenance operations for more than 2,800 pieces of equipment, resulting in a high operational readiness rate for the brigade's route clearance fleet and ensuring that the brigade's other low-density specialty equipment remained available for operations. In order to ensure that this equipment could be used under combat conditions and protect our Soldiers, Airmen, Sailors, and Marines, this section oversaw the fielding of numerous pieces of counter-IED equipment.

The logistics section also executed the brigade's container management system, averaging more than 650 containers daily, ensuring that there were no commercially owned containers on hand. Further, Soldiers of the brigade headquarters operating the Class IV yard packed or unpacked and moved more than 450 containers of construction material in support of surge operations. Finally, in support of all these operations, this section monitored and coordinated the request and execution of millions of dollars in nonstock funds, ensuring its proper execution and use in support of the brigade's missions.

Summary

The 411th Engineer Brigade left its footprint at more than 27 locations during its tour in Iraq. Each unit that served under the command—whether under administrative, tactical, or operational control—proved itself *Army Strong*. The 411th is grateful to every Service member who answered their nation's call to duty. The following articles (pages 8 through 21) highlight the brigade's successes and exemplify the drive of every Soldier, Airman, and Sailor to *Plan, Build, Protect: Assisting Iraq!*

Major Snel was the 411th Engineer Brigade public affairs officer for Operation Iraqi Freedom. He has served as a combat heavy platoon leader, executive officer, and construction inspection officer. He entered the Active Guard/Reserve (AGR) Program as an evaluation officer at the Army Reserve Readiness Training Center and continued in the AGR Program as a battalion liaison officer and battle captain during Operation Enduring Freedom and Operation Iraqi Freedom, as a combat mechanized company commander, and a brigade chief of operations. He holds a bachelor's in mathematics from Norwich University.

Assured Mobilty

By Major Craig Wertheim

During its year in Iraq, the 411th Engineer Brigade (Theater Army) designated key individuals for its assured mobility cell, which supported the brigade's main effort of keeping the corps main supply routes (MSRs) open for coalition forces. The missions consisted of—

- Route clearance.
- Blast hole repair.
- Route sanitation.

The first step in this main effort was route clearance. Planning for it started at the intelligence section, which compiled and analyzed all of the significant events from the previous weeks that occurred on the routes. The assured mobility cell then derived targeting recommendations for the brigade's route clearance battalion. Based on the slate of targeting recommendations, the route clearance battalion produced schedules that the companies used to perform their route clearance missions to force open the MSRs in support of coalition forces and the Iraqi people. During these long and dangerous missions, the engineers looked for improvised explosive devices (IEDs). The route clearance missions took up a good part of the day on the road. The Soldiers were engaged frequently by the enemy either with IEDs, small arms fire, or a combination of both.

The benefit of being a corps asset was the ability to send Soldiers wherever they were needed during operations. This support was in the form of additional route clearance assets when the maneuver units needed them. On numerous occasions, the 411th route clearance teams were called to clear the way for combat teams, allowing them to project combat power during operations. During the year-long tour, the route clearance teams performed 2,800 patrols, traveled more than 350,000 kilometers, and cleared more than 1,000 IEDs.

The second step to assured mobility was to deal with the blast holes formed when an IED detonated on a road. These holes ranged from a small indentation up to a crater that could swallow a truck. To combat these holes, the brigade used construction assets from its construction and combat engineer battalions. This operation took not only engineers but also a combined arms team to make it a success. Frequently, the brigade sent out reconnaissance teams to identify and inventory new holes throughout the area of operations, and this data was made available to all units that crossed the area. It was important to inventory these obstacles to speed repair operations and prevent future IED attacks.

Once the engineers performing the work identified which holes would be filled on a mission, the brigade contacted the brigade combat teams (BCT) that owned the battlespace to coordinate security for the operation. Then the mission was confirmed, supplies were ordered, and the mission was executed. On a given mission the team could fill three to eight holes, depending on their size. The final job for the team was to mark each hole with a distinctive number and symbol. This allowed identification by friendly forces and helped track whether the hole was ever used again by anti-Iraqi forces (AIF). Security was needed to observe the blast holes to ensure that AIF did not emplace another IED in the hole just filled in. When the holes were repaired, the

Soldiers from the 92d Engineer Battalion repair a blast hole formed by an IED detonation.

Vegetation and debris are cleared from the median and shoulders of the MSRs as part of route sanitation.

road was ready for traffic to resume. The 411th filled more than 600 blast holes along the corps MSRs during its deployment.

The third step toward assured mobility was route sanitation, which consists of clearing vegetation and debris from the median and shoulders of the MSRs. In Iraq, where IEDs are placed in every imaginable shrub or piece of trash, route sanitation is essential to keeping the MSRs open. It was left to the route clearance battalion to decide when and where to perform this mission. Clearing the MSRs of vegetation and debris disrupts the enemy's ability to emplace IEDs close to where coalition and civilian vehicles travel. It also inhibits concealed movement by AIF, diminishes their ability to set up traps, and forces them to place their IEDs farther back from the road. This standoff increases the survivability of coalition forces. Route sanitation is a never-ending battle in Iraq. The brigade usually ran multiple sanitation missions each week.

After finding an IED during one of its missions, the route clearance team blows it in place.

The 411th made great strides in assured mobility. The route clearance teams' rates for IEDs found and cleared rose steadily, but this was not without sacrifice. The brigade had 10 Soldiers killed in action and numerous Soldiers wounded. As the corps brigade, it had the flexibility to help reach out and impact the corps mission. The 411th saved countless lives, not only for the coalition but for the Iraqi people as well. IEDs will continue to be the enemy's weapon of choice, and engineers will continue to clear a path through them to victory.

Major Wertheim was the 411th Engineer Brigade assured mobility section leader. Previous assignments include vertical construction platoon leader, aide-de-camp, company commander, and battalion intelligence officer. In the civilian sector, he is the sales manager for Holland & Sherry Incorporated, a luxury fabric importer.

Al Bakir Freshwater Treatment Plant

By First Lieutenant Darren J. Friot and Lieutenant Colonel James H. Lukehart

The Al Bakir freshwater treatment plant is part of the Balad Air Base complex, which was built in the 1970s and 1980s as part of Saddam Hussein's military buildup. It is located on the banks of the Tigris River about two kilometers from the base perimeter. A Yugoslavian company under contract to the Iraqi government designed and built the plant, with most of the construction being completed by Yugoslavian workers. The plant was built to provide potable and irrigation water to the base and the nearby village.

In May 2004, members of the 86th Engineer Team (Dive) inspected the Al Bakir freshwater intake lines, designed to draw their water from the neighboring river. The team found only one of the four intakes exposed, and the other three buried beneath a 15-foot mound of sediment. The team proposed five courses of action to keep the intakes clear of sediment. But no action was taken at the time, and the final water intake became clogged by 2005. As a result, a temporary aboveground pumping station was installed by the Iraqis.

Existing Situation

The 411th Engineer Brigade construction management section (CMS) first visited the Al Bakir freshwater treatment plant in September 2006. The plant was operational, but its cisterns were being filled by the cobbled-together system of pipes and worn-out pumps that were set on the ground, exposed to the elements and vehicular and foot traffic. This system was in poor condition, leaked badly, and required that all water be pumped into the cisterns before it could be processed through the rest of the system. Water could not be pumped directly to the clarifiers for processing. The pumps used to get water from the chlorinated water tanks to the water net were undersized and worn, providing only a portion of the water needed in the peak summer months, when temperatures frequently exceed 120 degrees. The generator that powered the water plant was worn-out, and there was no backup generator to pick up the load if the first generator failed or was down for maintenance. The gravity lines that fed the two large cisterns were nonoperational.

Al Bakir water tower

The managers at the Al Bakir freshwater treatment plant had decided that the only way to keep the plant operational was to pump water into the cisterns, so two much-worn pumps had been installed at the Tigris River. These pumps effectively bypassed the gravity feed lines that had become completely unusable. The remaining parts of the plant were worn but still serviceable. Raw water from the cistern was being pumped to the clarifiers, then to the sand filters, then injected with chlorine, stored in tanks for 24 hours, and finally pumped to the village of Al Bakir for consumption. The pumps installed at all stages of the process were badly worn but continued to operate. A 250,000-gallon water tower was not operational, which added further to the strain on the system's pumps. The Iraqi national power supply was sporadic, lasting four hours a day at most. The plant provided 250,000 gallons of potable water and 150,000 gallons of irrigation water to Al Bakir and its 5,000 residents daily. When fully operational, the plant was capable of providing more than 650,000 gallons of potable water and 500,000 gallons of irrigation water daily.

Scope of Project

To adequately upgrade the Al Bakir freshwater treatment plant, a design incorporating the jury-rigged system the Al Bakir engineers had built was deemed the most

Pump station for treated water at Al Bakir

practical and versatile solution. The original gravity feed system to the cisterns was considered unsalvageable and was abandoned due to the almost constant maintenance required to keep it free from sedimentation from the high silt content of the Tigris River. Several innovations not found in the original system, but added on the temporary Iraqi system, were incorporated into the new permanent design. These innovations included separate lines to deliver water directly to the clarifiers, bypassing the cisterns and smaller intake lines that could be pulled and repaired if damaged or blocked by sedimentation.

Since a functional water tower was deemed critical for the system to function properly and not put undue wear on the pumps in the water system, the nonoperational water tower would have to be repaired.

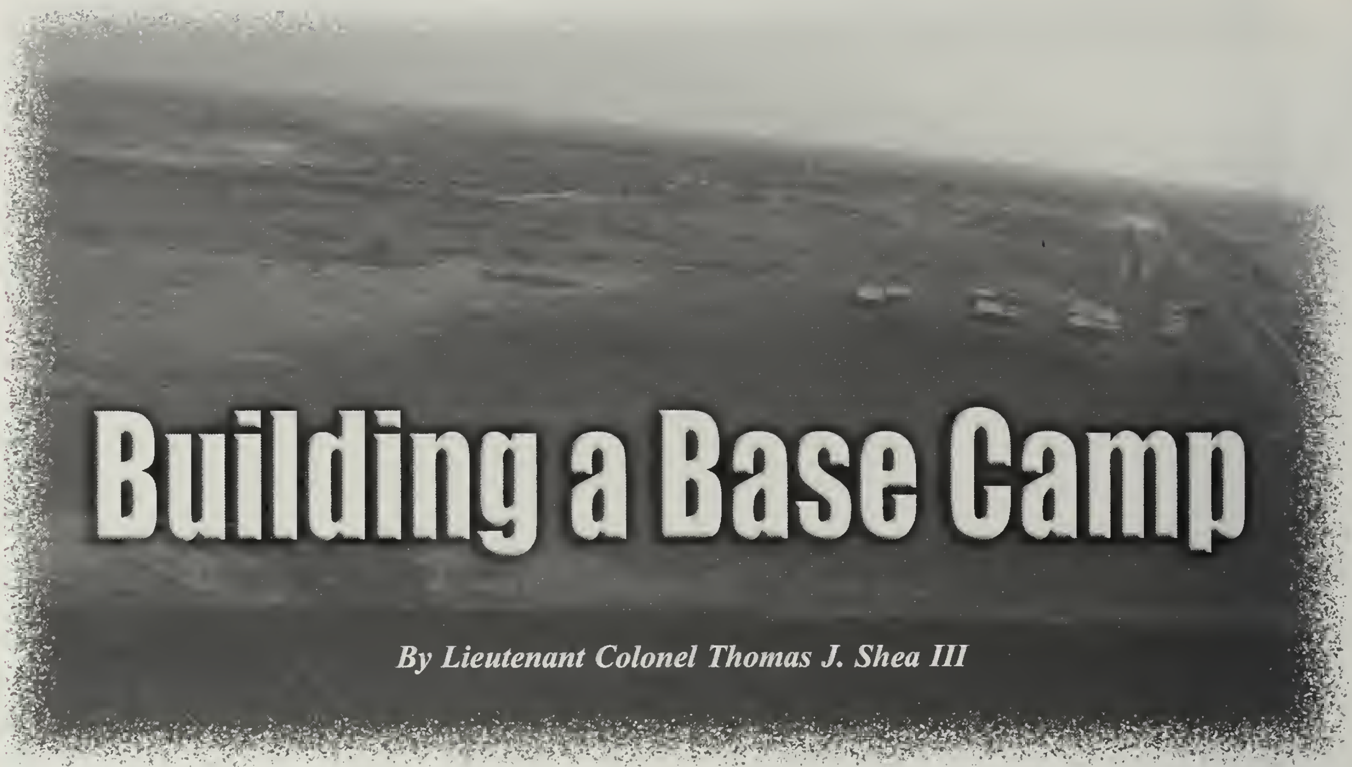
The 411th Engineer Brigade would work in cooperation with the Iraqi engineers responsible for keeping the Al Bakir plant running. It was understood from the start that this project would be designed and built by Iraqis. The 411th would provide engineer expertise and an independent government estimate once the project was ready to move forward. As part of working with the Iraqi engineers, the 411th prepared its own designs, engineering calculations, and construction drawings and specifications to facilitate an accurate independent government estimate to apply for a Commander's Emergency Relief Program (CERP) funding packet.

Conclusion

The project received CERP funding, and the contract was executed at a cost below the original estimate. An extensive knowledge of what the project required and an excellent working relationship between the 411th Engineer Brigade CMS engineers and the Al Bakir engineers helped the project proceed smoothly, and it was completed in April 2007 without any significant problems. Al Bakir now has a reliable source of water from the ancient Tigris River for its freshwater treatment plant and the potential to provide water to neighboring villages.

First Lieutenant Friot is the commander of Headquarters Company, 411th Engineer Brigade. His previous assignments include civil engineer/construction inspection officer with the 411th Engineer Brigade construction management section, Balad, Iraq; and executive officer and platoon leader, C Company, 479th Engineer Battalion. In his civilian career, he is an operations leader with the General Electric Company, Schenectady, New York. He is a graduate of Clarkson University, Potsdam, New York.

Lieutenant Colonel Lukehart was the deputy engineer for the 411th Engineer Brigade construction management section. His previous assignments include deputy adjutant, 70th Regional Readiness Command; executive officer, 3d Chemical Battalion, 104th Division (Institutional Training); and operations and training officer, then commander of the 476th Chemical Battalion. In his civilian career, he is a facility manager for the University of Washington in Seattle. He is a graduate of the United States Army Command and General Staff College and holds a degree from the University of Washington.



Building a Base Camp

By Lieutenant Colonel Thomas J. Shea III

Most engineer officers never get the chance to see a base camp built from scratch, but I have had the opportunity to build two. The first was Camp Powderhorn, built in the Yoro Mountains of Honduras to support Exercise Fuertes Caminos 88. The second was Forward Operating Base (FOB) Hammer, recently built in an equally remote area in Iraq for the surge during Operation Iraqi Freedom.

Camp Powderhorn

Engineer Task Force 111 built Camp Powderhorn to very austere standards. We did not have access to the Internet; morale, welfare, and recreation (MWR) support; telephone systems; or the robust maintenance infrastructure that we can provide today at an FOB. An advantage we did have was that we designed, built, and lived in it—we were our own customer. Another advantage was that we had almost a year of lead time before we had to occupy the camp. Thus, we had plenty of time to lay it out, identify the required facilities, and develop the bill of materials (BOM). When the 52d Engineer Battalion arrived to build the camp, all the materials were on hand. Given the low security threat, we could drive an hour to the nearest hardware store for supplies, or two hours to a larger city for other supplies or repair parts.

Camp Powderhorn had the basics of a 1,000-person base camp. We built a shower facility and mess hall and used tents for command and control, billets, and an aid station. The 249th Engineer Battalion (Prime Power) provided two generators, and a quartermaster company provided water purification, shower, and laundry services. Communications consisted of a loud speaker, a radio teletype rig, and four satellite phones. Finally, we had a small post exchange that sold junk food and beer. Life was very simple and good.

FOB Hammer

FOB Hammer was almost the opposite in every respect. In January 2007, with the notice of the surge of forces into Iraq, Multinational Corps–Iraq (MNC–I) began its planning and decision-making process to determine where it would use each incoming brigade combat team (BCT). The outcome was a basing plan that fell to the corps engineer brigade, the 411th Engineer Brigade, to construct. In this case, MNC–I selected the Butler Range Complex as a site to house a BCT. Built a few years earlier, the range offered enough open space to construct an FOB. MNC–I told us to have the camp ready to accept the first elements by mid-March 2007.

Site Reconnaissance

Accepting some uncertainty in the final boundaries of the site, MNC–I and the 411th Engineer Brigade construction management section (CMS) conducted a joint reconnaissance of the proposed site. A single building to use and an understanding of the limits of the new base camp were the results. The CMS then sent a survey team to conduct a detailed topographic survey of the proposed camp, while the rest of the section used overhead imagery to begin to lay out the facilities and develop the force protection plan. Before its completion, the limits of the camp and its name changed several times.

Planning

To synchronize the many aspects of the planning and execution of the construction, we formed a special team within the brigade from the primary sections involved in the planning: operations, supply, CMS, and the subordinate units. This team gathered regularly to identify and resolve issues and met with the MNC–I engineer section (C7) and the 13th Sustainment Command (Expeditionary), both of which conducted similar meetings. The cross-communication was critical to the ultimate success of building FOB Hammer.

The basic plan for the camp was to use Army Force Provider kits and supplement critical facilities with Southwest Asia (SWA) huts. A Force Provider kit provides tents, environmental control units, generators, kitchens, dining areas, MWR tents, beds, and a chapel, as well as laundry, latrine, and shower facilities. Engineers are required to prepare the ground, construct force protection measures, and install electrical and plumbing components. Since only four Force Provider kits were available, MNC–I contracted for the remaining necessary tents, beds, generators, and environmental control units.

Airmen construct future brigade headquarters.

Construction Priorities

The base camp was planned in increments that supported the MNC–I priorities for construction. The general layout of the camp included areas for each unit as well as areas for contractor general life-support functions, such as—

- Burn pit.
- Water purification units.
- MWR.
- Entry control points.

We also considered special topics, such as—

- Detainee holding area.
- Brigade medical treatment facility.
- Helipads.
- Force protection.

The result of this planning was the recognition that the entire BCT could not be moved into SWA huts. Thus, it was decided that key facilities such as the brigade headquarters, battalion headquarters, medical treatment facility, and maintenance facilities would be placed in SWA huts. Everything else would stay in tactical vehicles or field tents drawn in Kuwait. These facilities were then prioritized for the 411th to build.

Coordination

During the entire planning time and well into the construction phase, interface was nonexistent with the surge unit, which was either at its home station or in Kuwait training for its upcoming mission. Eventually, some contact was established via e-mail or a liaison officer, and the surge unit was able to review the overall site plan and the layouts for the brigade and battalion SWA huts. We received minimal comments and made all of the requested changes. Mostly, the leaders of the surge units had to trust that we were going to do the right thing for them, and the CMS did not take that responsibility lightly. Once the surge unit hit the ground, additional coordination began and the combined team made several site changes.

Building Design

The actual design of the SWA huts was relatively easy. The CMS used several sources, to include the Theater Construction Management System and previously built SWA huts. One alteration was to the width of the building. This change accommodated the RED HORSE squadron since it already had jigs built for the roof trusses. To speed up the process, we gave the construction unit our designs in increments, such as the initial layout, finalization of the details, and development of the BOM. This served several functions: it allowed the constructing unit as much time as possible to conduct its planning and provided a review process to catch errors and omissions in the BOM.

Construction Priorities

In keeping with MNC–I construction priorities, we started with the perimeter berm and concertina wire, and at the same

“Most engineer officers never get the chance to see a base camp built from scratch, but I have had the opportunity to build two.”

time we built a small engineer camp to house the construction force. HESCO barriers for force protection around the housing areas, the billeting tents, and the dining facility came next. The overriding goal was to provide a safe place for the surge unit to live and eat. The burn pit, water supply, and blackwater lagoon were the next priorities for horizontal construction, while the brigade headquarters, medical facility, and battalion headquarters were priorities for vertical construction. A brigade ammunition holding area, a detainee holding annex, and upgrades to the existing helipads were also constructed.

While most force protection measures in Iraq use the T-Wall®—a precast concrete retaining wall system—or some variation of it, the tactical situation at the time of the construction prevented us from using it. Instead, we used 7-foot and 4-foot HESCO barriers. A key lesson to remember is to develop a drainage plan for the area protected by the barriers. This includes grading the area to create a sloping crown, ditching key areas to drain the water to where you want it, and including seep pipes under the barriers to allow additional draining. Failure to include this will create a pool and a mud bath, which Soldiers will not enjoy.

The 411th Engineer Brigade was fortunate that the RED HORSE squadron assigned to the mission was composed of National Guard personnel who recently performed a similar mission in support of Hurricane Katrina relief. The squadron provided the command and control cell and half of the construction force, while the 92d Engineer Battalion from Fort Stewart, Georgia, provided its Bravo Company as the other half of the construction force. It was a pleasure to watch these two units come together and operate as a single joint force.

Logistics

The final critical piece to the whole operation was the logistics. As previously stated, the camp was in a remote location. If located in the United States or some other part of the world, the distance to a nearby town might not be too great, but this was Iraq. Everything had to be trucked in—Force Provider kits, contractor tents, lumber, electrical BOM, water, and all classes of supply. (Eventually, a water source was found, so it was no longer necessary to truck it in.)

In addition to the normal logistical packages, the 411th Engineer Brigade supply section sent more than

Construction on the medical treatment facility began once force protection measures were in place.

Construction of an engineer living area was a top priority.

300 containers of lumber, concertina wire, and electrical parts to FOB Hammer. We had to procure all of the electrical BOM locally. And while the Iraqis can deliver dimensional lumber fairly quickly, it took at least 30 days to deliver electrical parts. That was after awarding the contract, which takes about 30 days. Since our regulations consider construction materials to be permanent supplies, our field ordering officers are not allowed to purchase them. Special care must be taken in the identification of the BOM, or the project could be delayed 60 days or more.

Gravel and concrete pose a special problem in Iraq. For FOB Hammer, we initially programmed more than 100,000 cubic meters of gravel for roads, limited dust control, and the maintenance areas. Gravel deliveries from the three companies with contracts were slower and of lower quality than expected. The constant problem with gravel in most of Iraq is that it is river run and not well gradated. This leads to poor quality concrete and roads that require constant maintenance. We never found a contractor willing to deliver ready-mix concrete to the camp.

Summary

During the initial buildup of the camp, the 13th Sustainment Command (Expeditionary) and its 15th Sustainment Brigade provided outstanding support. It was interesting to learn that when the 15th sent a small party to FOB Hammer to coordinate logistical support, they brought their own communications package, including long-range voice and satellite voice and data capabilities. The engineers, on the other hand, relied on a single AN/PRC-150 radio—mounted in a high-mobility, multipurpose wheeled vehicle (HMMWV)—and a TeleEngineering Toolkit. We had no way to send e-mail messages with status reports, requests for BOM, or construction drawings in a secure and timely manner. As a result, I believe it is important that we take a hard look at how we are equipping our new deployable brigade command posts and ensure that they have the same communications capabilities that other brigades have.

Although the experiences were quite different, planning and building Camp Powderhorn and FOB Hammer were both very rewarding. The challenges of building a base camp from scratch can be daunting. But by building on the lessons learned from others, we can quickly provide our Soldiers the accommodations they need to support their missions.

Lieutenant Colonel Shea serves as the design engineer for the 411th Engineer Brigade. His active duty assignments include Korea; Honduras; Turkey; Fort Stewart, Georgia; and Fort Dix, New Jersey, serving in both troop and United States Army Corps of Engineers® (USACE) positions. His Reserve assignments include USACE, the 411th Engineer Brigade, and the 305th Engineer Detachment (Real Estate). In civilian life, he is a New York District USACE project manager.

U.S. Air Force Photo/Courtesy of the 557th EHRS

Army and Air Force Engineers Provide Bed-Down for Surge Troops

By Captain Ken Hall

Earlier this year, only dirt and desert tumbleweeds could be found 1½ miles southeast of Besmaya Range, where Iraqi soldiers train. But then a United States Army unit—the 3d Brigade Combat Team (BCT), 3d Infantry Division—conducted missions in Operation Enforcing the Law, known to the media as the *Fardh al-Qanoon,* or "Baghdad Security Plan." That plan began when General David Petraeus, commander of Multinational Forces–Iraq (MNF–I), directed new combat brigades to deploy in and around the Iraqi capital. On 18 February, orders flowed from MNF–I to the Army's 411th Engineer Brigade to build a base at Besmaya to accommodate troops by 26 March. The Besmaya project was just one of many the 411th was tasked to accomplish as part of its main missions, which included—

- Route clearance and sanitation.
- Rapid crater repair.
- Engineer support to the 3d Infantry Division and other combat units.
- Planning, design, and construction of contingency operating bases.
- Command and control of tactical bridging assets.

U.S. Air Force Photo/Courtesy of the 557th EHRS

Soldiers from the 92d Engineer Battalion complete guard towers along FOB Hammer's perimeter berm in Iraq. Airmen from the 557th Expeditionary RED HORSE Squadron and Soldiers from the 92d Engineer Battalion's "Black Diamonds" were tasked to bed-down the Army's 3d BCT, 3d Infantry Division, in support of the Baghdad Security Plan.

The 411th was organized to accomplish those missions, with assistance from subordinate units that included the Arkansas Army National Guard's 875th Engineer Battalion, the Active Army's 92d Engineer Battalion, and the United States Air Force's 557th Expeditionary RED HORSE Squadron (ERHS). The 557th ERHS, performing an "in-lieu-of" mission for the Army in Iraq, built the base 30 kilometers east of Baghdad. Approximately a month later, Soldiers had a place to hang their hats at night "inside the wire." RED HORSE, which stands for "rapid engineer deployable heavy operational repair squadron, engineers," provides the Air Force with a highly mobile civil engineering response force to support contingency operations worldwide. With Airmen from Active, National Guard, and Reserve Component assets, the 557th is engaged in engineering projects throughout Southwest Asia. The unit is part of the 732d Air Expeditionary Group, under the 332d Air Expeditionary Wing headquartered at Balad Air Base northwest of Baghdad.

A bed-down tasking is a two-step process for the engineer force. First, the force itself needs facilities to work, sleep, and eat. Then the main engineer force can move in and begin construction on the tasked project. As part of step one, engineers from the 557th ERHS and the 411th Engineer Brigade formed a survey team and deployed to the site to work out detailed plans for the new base. What they found was spartan. A bombed-out structure remained, with only three walls intact and a roof that was caving in. Other buildings had been reduced to rubble that would need to be cleared for new facilities. Surrounding it all was a 3½-foot berm, traversed by goat trails, that formed a protective perimeter barely substantial enough to trip over. They had their work cut out for them. The 411th's construction maintenance section (CMS) completed a site reconnaissance with members of the MNC–I logistics and engineering sections, walking the site and taking photographs. Then the CMS and members of the 557th conducted a site survey to collect topographic information and overhead photographs to drop into the computer-aided drawing software to plan and build Forward Operating Base (FOB) Hammer (see article, page 12).

While the five-day survey was being conducted, RED HORSE engineers back at Balad Air Base were planning how to bed-down the engineer force. They determined that the force would need a tailored Harvest Falcon kit (a prepackaged, transportable base camp) to sustain them while they built the rest of the base for the troops of the incoming 3d BCT. A full Harvest Falcon kit includes tents, hard-wall shelters, area lighting systems, basic water and electrical systems, latrines

Photo by Rob Curtis/Air Force Times

RED HORSE engineers install roof trusses as they build up FOB Hammer for the 3d BCT in Besmaya, Iraq.

U.S. Air Force Photo/Courtesy of the 557th EHRS

Soldiers from the 92d Engineer Battalion fill HESCO Bastion Concertainers® for force protection at FOB Hammer.

U.S. Air Force Photo/Courtesy of the 557th EHRS

More than 33,000 cubic meters of debris were removed from land at FOB Hammer.

and showers, a kitchen facility, environmental control units, and other basic equipment. The first five days of actual construction saw huge amounts of Harvest Falcon assets moving from outside Iraq to Balad by numerous aircraft, then convoyed by tractor-trailer and helicopters to Besmaya to build the facilities for the engineers. In addition, heavy equipment (loaders, bulldozers, graders, and excavators) and supplies (food, water, fuel, hand tools, and lumber for tent flooring) were transported to the site in the continuous stream of convoys and helicopter loads.

While they were building the engineer facilities, materials for the main camp were being moved in, including—

- Three Army Force Provider kits.
- Two life support area kits.
- Reverse osmosis water purification units (ROWPU) to produce fresh water.
- Lumber, plywood, and nails to construct Southwest Asia huts.
- Concertina wire and pickets.
- Prefabricated guard towers.
- Bottled water; meals, ready-to-eat; and 50-person unitized group rations to sustain the construction force.

As materials came in to Besmaya, the construction force already there began erecting the tent city and fortifying the perimeter berm. The RED HORSE Airmen focused on vertical construction while Soldiers from the 92d performed the horizontal construction. The camp was designed to provide the 3d BCT with dining facilities and a headquarters made by refurbishing the bombed-out structure. Each battalion was to get a tactical operations center and maintenance building. Prefabricated guard towers, elevated fighting positions, and perimeter berms would provide force protection. Morale, welfare, and recreation facilities would complete the project.

Water for the camp comes from the Tigris River, which makes its way toward the camp through an old canal system. To make it usable for the brigade, engineers had to undam several points on the canal to get the water to within 2½ miles of the camp. It is first pumped to a new holding pond, then pumped to two ROWPUs where it is made potable and pumped to water storage bladders. The potable water stored in the bladder farm provides drinking water for the brigade, and the pond provides nonpotable water for showers and laundry facilities.

For the 3d BCT Soldier, all that really matters is that he and his fellow "Sledgehammer" Warriors now have a place to call home after each day's patrols in Baghdad—a place where it is safe to take off battle armor and get a hot meal.

Captain Hall served as deputy chief of public affairs for the 332d Air Expeditionary Wing while in Iraq and has now returned to duties as chief of public affairs for the 47th Flying Training Wing, Laughlin Air Force Base, Texas.

Reserve Component Volunteers—Filling the Gap

By Lieutenant Colonel Trent M. Andrews

Soldiers of the United States Army Reserves and Army National Guard continue to volunteer to serve beyond their 12-month tour of duty. These Soldiers extend to serve in the Army's formations wherever their military occupational specialty (MOS), experience, and leadership can be used. They are staying in-theater to continue to serve from one to two extra months. A small number of Soldiers are even raising their hands to stay for a third consecutive year. Whether it is for monetary reasons, a poor job market back home, or just a strong pull by the mission, the list of volunteers fills several pages.

The mechanism these Soldiers use is the Contingency Operation–Active Duty for Operational Support (CO–ADOS) orders. These orders are ultimately cut by the United States Army Human Resources Command in St. Louis, Missouri, but the process starts with the Soldiers. They must find a unit with an opening for their MOS or skill set, then sign a Department of the Army (DA) Form 4187 and a volunteer statement. The gaining unit must prepare a letter of justification that demonstrates how the Soldier's skills are needed to meet the unit's mission requirements. Sometimes a Soldier's skill set is not necessarily the result of MOS training. This is another example of how America's National Guard and Reserve personnel frequently bring added value to their units. For example, one unit had a volunteer who was officially in the Signal Corps but also had in-depth experience with preparing contracts. This added bonus filled a critical need in the headquarters where she served out her additional six months in-theater under CO–ADOS orders.

The journey for these Soldiers begins like many other things in the military—by stepping up and putting their names and other required information on a volunteer form. These forms are gathered at CJ-1 (the joint military section) of Multinational Corps–Iraq (MNC–I) and distributed on a master list across the theater. Units looking for Soldiers to meet mission requirements can review the list and match their needs with the MOS, rank, and availability date of the volunteer. Once a tentative match is made, the coordination to prepare the CO–ADOS packet begins. The Soldier and gaining unit must sign the DA Form 4187, and the Soldier signs the volunteer statement to extend in-theater for the mutually agreed upon period of time. The gaining unit with the first colonel in the chain of command then signs a letter of justification for the Soldier to stay on active duty orders, and the entire packet is forwarded to CJ-1 for the next step in the review process.

When Reserve or National Guard units prepare to mobilize and deploy, they often have vacancies on their manning rosters, also referred to as battle rosters. Since Operation Iraqi Freedom has extended over multiple rotations, the number of Soldiers who have not deployed is small. A unit may then actively seek Soldiers who are willing to return to Iraq for another rotation. Also, Soldiers may hear of a unit getting ready to deploy and volunteer to join that unit. These efforts work toward filling 100 percent of the modified table of organization and equipment (MTOE) requirements, but may still leave the unit short of meeting critical mission requirements not addressed by the MTOE. The 411th Engineer Brigade, a United States Army Reserve unit from New York, experienced such a deficit. The brigade discovered during its pre-deployment site survey that it would inherit a multimillion dollar Class IV yard containing construction materials for the numerous construction projects throughout the theater. The brigade's mission analysis identified a deficit of seven Soldiers to operate the Class IV yard. Efforts began in Kuwait to recruit Soldiers for this mission and initiate the CO–ADOS (then called CO–TTAD for contingency operation-temporary tour of active duty) packets to allow them to stay. Efforts continue to recruit Soldiers to fill this mission requirement as the unit deployed from Kuwait to its mission location in Iraq. The CO–ADOS mechanism contributed to the successful manning of the Class IV yard, which became critical to supporting surge construction operations for coalition forces and other MNC–I priority construction projects.

There is room for improvement in this process as it gains momentum. It would be beneficial for units preparing to mobilize and deploy to have a copy of the volunteer list before arrival in-theater in order to initiate the packets. This could be accomplished by distributing the list through United States Army Reserve Affairs to United States Army Reserve Command headquarters or to the mobilization platforms. This would help decrease the time it takes to match units' known requirements with the volunteering Soldiers.

Another significant improvement would be to allow Reserve Soldiers to serve on CO-ADOS orders with an Active Army unit (especially units without a joint manning document [JMD]), provided the MOS and grade/rank requirements are met. That change would have allowed a number of volunteers from the 411th headquarters to remain with the Active Army unit that replaced the 411th, which would have contributed to continuity and a seamless transition between the two rotations. Currently, an Active Army unit must have a JMD with Reserve Component authorizations for Reserve Soldiers on CO-ADOS orders to serve there. If the process of CO-ADOS approval allowed a letter of justification signed by a brigadier general or higher, seasoned volunteer Reserve Soldiers with necessary skill sets could remain in-theater.

The real focus of this article is to highlight the spirit of volunteerism of our nation's Citizen-Soldiers. Normal total deployment time is fourteen to fifteen months for Reserve and National Guard Soldiers, and those who volunteer and remain for an additional period of time demonstrate a patriot spirit that imbues the Army values. A total of 82 Soldiers from the 411th Engineer Brigade have volunteered to extend their service in support of Operation Iraqi Freedom.

Lieutenant Colonel Andrews is the Assistant Chief of Staff for Personnel, 411th Engineer Brigade (Theater Army).

Air Force Engineers Support Surge

By Lieutenant Colonel Douglas D. Hardman

In early December 2006, the United States Air Force's 732d Expeditionary Civil Engineer Squadron stood up Detachment 3 to support the United States Army's 411th Engineer Brigade. Replacing the 803d Utility Detachment, the Air Force detachment completed seven major construction projects during its first rotation and handed over three more projects that were in progress when it rotated out of theater. It was a testament to the Airmen and their accomplishments as part of a joint engineer team. In order to support the surge of troops in Iraq, the Airmen were tasked to completely rebuild a much-needed facility. Existing earthen berms were demolished, then replaced with HESCO Bastion Concertainer® units. Then new berms were built around the new perimeter and roads in the area were rebuilt and strengthened. In only 21 days, the detachment doubled the storage capacity of the largest facility of its kind on location, while allowing uninterrupted operations by the facility's personnel.

To facilitate the flow of horizontal construction materials to three forward operating bases in central Iraq, the detachment was tasked with the expansion of the base's transload yard.

Detachment 3 Airmen construct a landing pad and taxiway for the 3d Infantry Division's Combat Aviation Brigade.

Airmen construct new headquarters facilities for brigade combat teams.

This expansion was integral to ensuring the safe flow of construction materials to units in the field. The Airmen completed Southwest Asia huts in support of local units. These facilities met a crucial need for troops operating in the area. With the standup of the new Multinational Division–Central and the arrival of the surge units, they were tasked to turn an existing warehouse into workspace. In only three weeks, the Airmen transformed the facility into what the commanding general praised as " . . . a better facility than they have back at our home station."

In addition, the Airmen pushed dirt in support of the incoming surge. In a short time, crews transformed a dry lake bed of several acres into usable land by raising the elevation of the site, ensuring positive drainage, and preparing the site to bed-down incoming troops. The detachment constructed multiple horizontal and vertical projects from scratch to support the incoming unit. The mission was again completed in a very short time, allowing the timely bed-down of the entire unit and its equipment. The surge of forces brought about the requirement for expedient command and control workspace to accommodate the incoming units. The detachment constructed tents as work centers for units supporting the incoming unit.

Finally, to improve the quality of life for maintenance personnel, the Airmen began work on projects to provide storage pads for local unit motor pools. This project will provide adequate space for vehicle maintenance personnel during adverse weather conditions.

The accomplishments of these Airmen had a direct impact on the successful execution of Operation Iraqi Freedom by providing outstanding mission support for combat units in the Iraqi area of operations. The dedication of the Airmen from Hurlburt Field, Florida; Mountain Home Air Force Base (AFB), Idaho; Charleston AFB, South Carolina; McConnell AFB, Kansas; Ramstein Air Base (AB), Germany; and Aviano AB, Italy, are a testament to the Air Force's ability to provide fast, top-notch combat support.

Lieutenant Colonel Hardman is the detachment commander, 732d Expeditionary Civil Engineer Squadron.

Dedication

The following members of the Engineer Regiment have been lost in the War on Terrorism since the last issue of *Engineer*. We dedicate this issue to them.

Ball, Master Sergeant Scott R.	Headquarters & Headquarters Company, 55th Brigade	Scranton, Pennsylvania
Clark, Sergeant Cory L.	585th Engineer Company, 864th Engineer Battalion	Fort Lewis, Washington
Herold, Specialist Adam G.	2d Battalion, 377th Parachute Field Artillery Regiment (Airborne)	Fort Richardson, Alaska
Herrera, Sergeant First Class Rocky H.	585th Engineer Company, 864th Engineer Battalion	Fort Lewis, Washington
Howard, Sergeant Bryce D.	585th Engineer Company, 864th Engineer Battalion	Fort Lewis, Washington
Howells, Specialist Alun R.	1st Battalion, 64th Armor Regiment, 2d Brigade Combat Team	Fort Stewart, Georgia
Ingles-Rios, Master Sergeant Julian	130th Engineer Battalion, Puerto Rico National Guard	Aguadilla, Puerto Rico
Modgling, Private First Class Joshua S.	1st Battalion, 30th Infantry Regiment, 2d Brigade Combat Team	Fort Stewart, Georgia
Steele, Captain Joshua E.	1st Brigade, 1st Infantry Division (Transition Team)	Fort Riley, Kansas
Wiens, Corporal Kory D.	94th Engineer Detatchment (Canine), 1st Engineer Brigade	Fort Leonard Wood, Missouri
Zapfe, Sergeant First Class William A.	1st Battalion, 30th Infantry Regiment, 2d Brigade Combat Team	Fort Stewart, Georgia

OPERATION Sand Castle 2007

By Brigadier General Jeffrey W. Talley

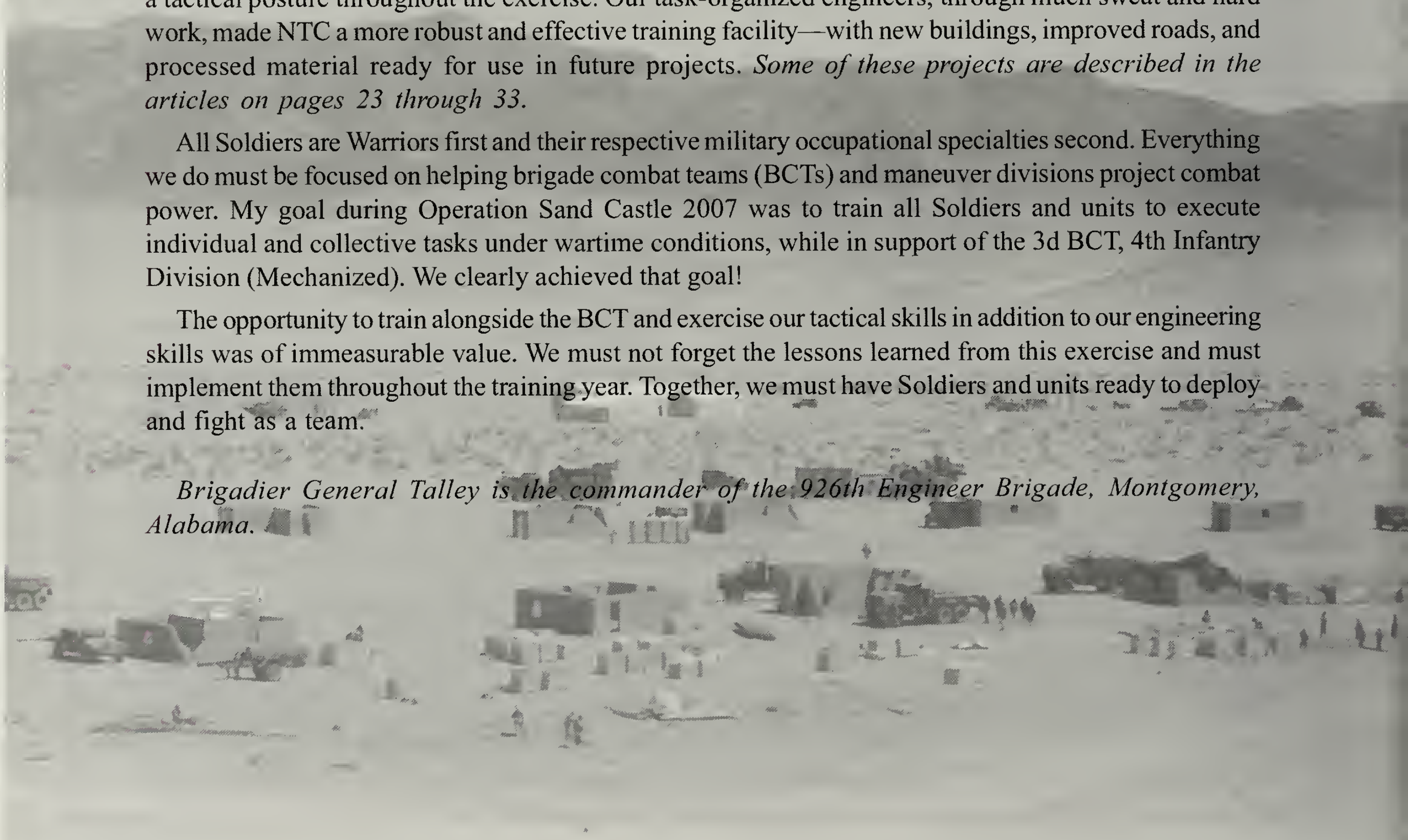
Operation Sand Castle 2007 was an Army Reserve exercise designed to challenge engineers to perform their mission in a tactical combat environment. The exercise consisted of several phases, including thousands of man-hours of planning; predeployment preparation; reception, staging, and onward integration (RSOI); stability operations; and the safe redeployment of all equipment and personnel. The overall goal of the exercise was to provide each command team within the 926th Engineer Brigade the ability to train their unit as it will fight, with the stresses, operational tempo (OPTEMPO), challenges, and danger the current battlefield presents. The National Training Center (NTC) at Fort Irwin, California, was the perfect backdrop for this training.

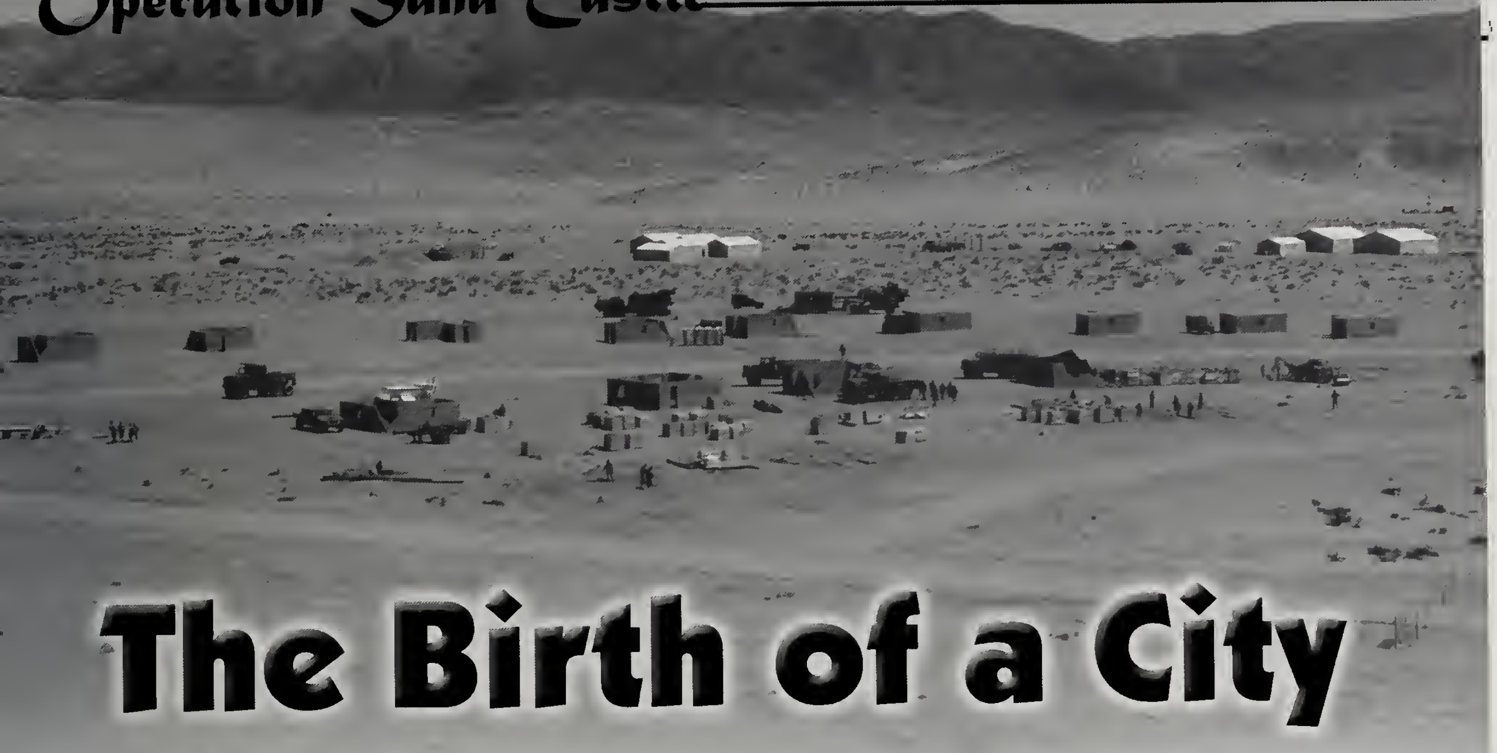
The 926th Engineer Brigade was task-organized with units that are not a normal part of its peacetime command, but with careful planning we successfully integrated and succeeded at our combat and construction-effects missions. We built permanent additions to NTC's training facilities, while maintaining a tactical posture throughout the exercise. Our task-organized engineers, through much sweat and hard work, made NTC a more robust and effective training facility—with new buildings, improved roads, and processed material ready for use in future projects. *Some of these projects are described in the articles on pages 23 through 33.*

All Soldiers are Warriors first and their respective military occupational specialties second. Everything we do must be focused on helping brigade combat teams (BCTs) and maneuver divisions project combat power. My goal during Operation Sand Castle 2007 was to train all Soldiers and units to execute individual and collective tasks under wartime conditions, while in support of the 3d BCT, 4th Infantry Division (Mechanized). We clearly achieved that goal!

The opportunity to train alongside the BCT and exercise our tactical skills in addition to our engineering skills was of immeasurable value. We must not forget the lessons learned from this exercise and must implement them throughout the training year. Together, we must have Soldiers and units ready to deploy and fight as a team.

Brigadier General Talley is the commander of the 926th Engineer Brigade, Montgomery, Alabama.





The Birth of a City

By Sergeant First Class Craig Pickett

Hundreds of thousands of Soldiers have trained for desert warfare at NTC. All come away with an appreciation for the heat and the challenges the desert brings to even the simplest missions. However, NTC is changing. With the help of the United States Army Reserves and Operation Sand Castle, it will eventually have in its training arsenal a booming Middle Eastern town. The long-term goal of Operation Sand Castle is to construct approximately 480 buildings over 10 years, creating a small city called *Medina Jabal.* This city will provide a backdrop similar to current operations, allowing Soldiers training at NTC to train in a robust urban environment that will help them save lives in the Middle East. The 10-year mission is now in its third year.

Photo by Sergeant First Class Craig Pickett

A Soldier mans a squad automatic weapon while on the jobsite at Medina Jabal. The heavy equipment operator with Company C, 854th Engineer Battalion, must keep an eye out for enemy forces and provide protection while his fellow Soldiers construct buildings.

The 412th Engineer Command from Vicksburg, Mississippi, was the exercise agent for year three of Operation Sand Castle. The command planned training, arranged logistics, and coordinated all the participating units. The 412th brought together a balanced team of Army Reserve units to accomplish the mission and provided quality training opportunities for the Soldiers. The units were from different commands and locations, and many had never worked together before. That fell in line with what units experience when they deploy overseas, making the training opportunity very realistic.

The 412th was also instrumental in integrating the Active Army brigade combat team (BCT) training at NTC with the Reserve elements. This gave both an opportunity to interact and to rely on each other as they would overseas on a real-world deployment. As Operation Sand Castle drew to a close, the planning had already begun for the 2008 rotation. In the works is a 10-mile section of road into the eastern expanse of NTC, as well as more buildings for Medina Jabal. As always, training will be paramount for everyone involved.

Sergeant First Class Pickett is a member of the 350th Mobile Public Affairs Detachment, an Army Reserve unit from Indianapolis, Indiana.

Photo by Sergeant First Class Craig Pickett

Members of the maintenance section, Headquarters and Headquarters Company, 854th Engineer Battalion, fill sandbags to place around the edges of their tents to keep sand from blowing in.

Photo by Sergeant First Class Craig Pickett

A Soldier from Company A, 854th Engineer Battalion, places forms for a building at the Medina Jabal work site.

Photo by Private First Class Christine Samples

Soldiers with Company A, 458th Engineer Battalion, check for levelness while building the door frame for a building at Medina Jabal.

Photo by Sergeant First Class Craig Pickett

Soldiers of the 770th Engineer Company pave the parking lot of the post theater at Fort Irwin, California, as part of Operation Sand Castle.

Operation Sand Castle

LAST CHANCE TO ROCK

By Private First Class Christine Samples

The 770th Engineer Company from Penn Yan, New York, probably the dirtiest Soldiers at NTC, made big rocks into little rocks at the quarry as part of Operation Sand Castle. The 770th worked 12 to 14 hours daily to supply crushed rock for construction projects. They also produced extra rock for a 10-mile road project that will be completed next year at Operation Sand Castle 2008. Their goal was to produce 800 tons of rock a day. That goal meant 40 trips for the crew in 20-ton dump trucks to deliver the product.

The rock crusher occupies about half a football field and is nearly 2 ½ stories high. It is made up of several components that can be disassembled and moved to the next location. The crusher starts its job when an operator in a bucket loader fills it with rock from the side of the quarry. Another crew member in the crow's nest controls large metal plates that crush the rocks into smaller pieces. The crusher then sifts the rock onto different conveyers for each size of rock—waste that is too small to use, one-inch rock, two-inch rock, and three-inch rock. Another crew member watches for any objects that aren't rock that managed to get into the product. The crushed rock is then spilled onto the ground in separate piles where it is stockpiled or transported to work sites. The dust produced by the crusher is like a thick fog that is hazardous to breathe. Members of the 770th wore goggles and face masks, but the dust still crept in to cover their faces.

Above: A member of the 770th Engineer Company scoops rock out of the side of a hill to feed the crusher.

Left: A Soldier with the 770th Engineer Company cleans the dirt from his uniform.

Dust created by the crusher as it throws out waste product covers the entire quarry area, making the 770th's job possibly the dirtiest one at NTC.

When the 770th Soldiers were deployed to Iraq, they never crushed rock and they probably won't have another opportunity to crush after they finish their rotation at NTC, because they're losing their crushing equipment to the Army National Guard and will have to find new military occupational specialties.

Private First Class Samples is a member of the 350th Mobile Public Affairs Detachment, an Army Reserve unit from Indianapolis, Indiana.

Operation Sand Castle

PAVING THE WAY

By Sergeant First Class Craig Pickett

Thanks to the 770th Engineer Company, a Reserve unit from Penn Yan, New York, NTC is getting a fresh topping of hot asphalt on some well-worn areas. Since there were no paving missions in the emerging city of Medina Jabal, planners turned their focus to the post. Three areas were identified based on the unit's mission-essential task list, time restraints, and project size—a portion of Barstow Road, the theater parking lot, and Hamby Barrack's parking lot. In keeping with the scope of the mission, all paving operations were done tactically, including Soldiers setting up perimeter security to guard against possible enemy attacks. The Soldiers wore full "battle rattle"—flak jacket, Kevlar helmet, and M-16 rifle—while they shoveled, pushed, and laid down the hot, rocky blend.

The noncommissioned officer (NCO) in charge of the lay-down projects was concerned about the extra gear. Since the personal equipment could get caught on machinery, leaders had to pay close attention to Soldiers as they worked and rely on battle buddies to make sure everyone was safe. Also, since the pavers work with hot equipment and materials, leaders had to ensure that Soldiers did not suffer from heat exhaustion and dehydration. Working in these conditions is not new to the Soldiers of the 770th. They deployed to Kuwait and Iraq from 2003 to 2004 and performed their paving mission daily in much worse conditions.

Photo by Sergeant First Class Craig Pickett

A Soldier uses a lute to smooth asphalt on a section of Barstow Road at NTC as part of Operation Sand Castle.

Photo by Sergeant First Class Craig Pickett

Members of the 770th Engineer Company repair a section of road at NTC in full combat gear.

Photo by Sergeant First Class Craig Pickett

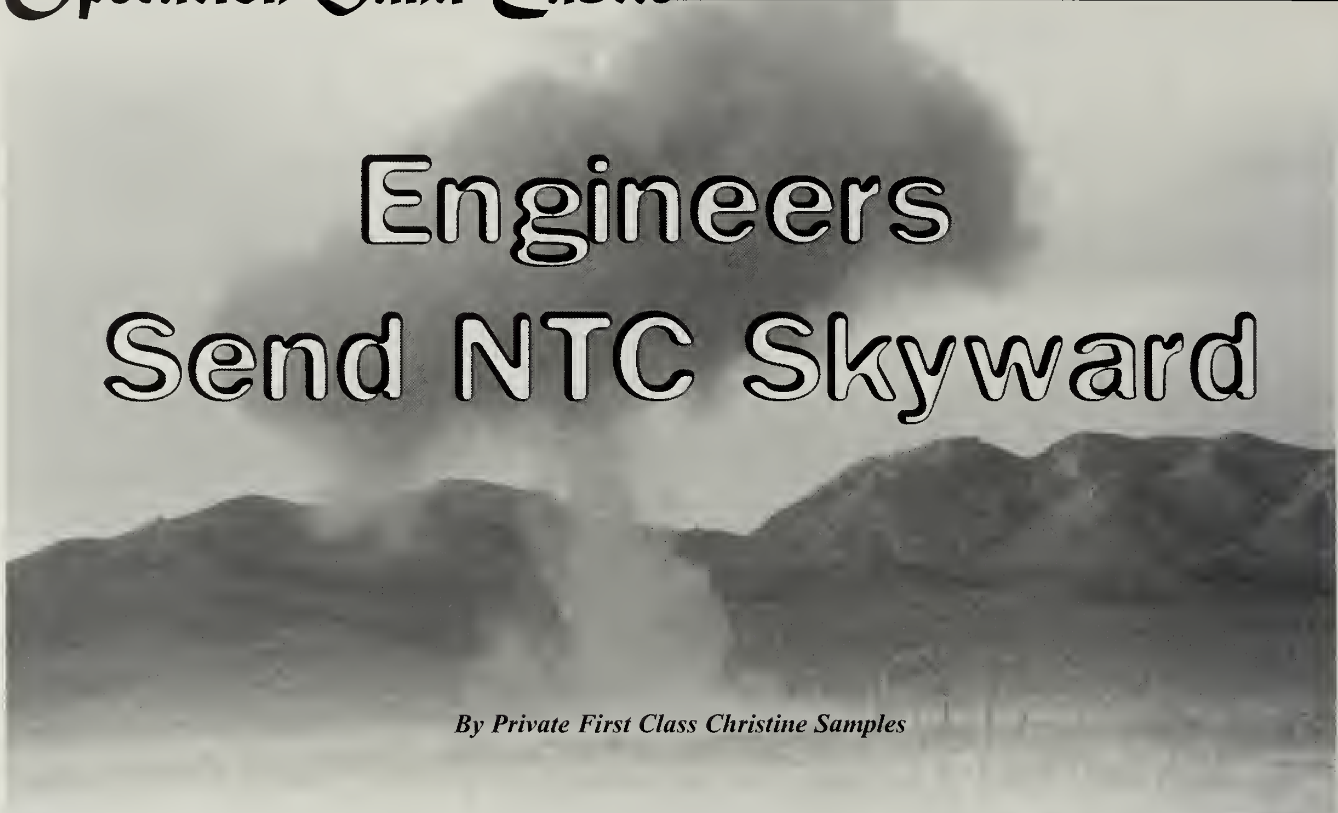
A Soldier shovels asphalt to fill in the gaps as the 770th Engineer Company repairs a section of Barstow Road at NTC.

They were tasked with repairing, patching, and fixing roads so that convoys could get through easily and quickly.

The projects at Fort Irwin may not determine life or death, but they are important for those living and working on post. They will be focal points for people parking on the lots and driving on the roads. Even the slightest bump will be noticed. The civilians in charge of setting up the projects were wary of the Reserve pavers and unsure of their abilities. Paving is expensive and if not done correctly can be costly to repair. But after two days of paving, they realized that the Reservists were good at their job.

A civilian truck driver delivering material to the crew on Barstow Road definitely had reservations about the Soldier pavers at first because an inexperienced paver operator could damage his truck if the paver does not maintain a straight course. He said the Army Reserve pavers were comparable to any commercial crew, and he was pleased that his truck came away unscathed. The paver operator, who kept the paver in line, said the hardest part of driving the paver is indeed keeping it straight, but also keeping an eye out for his fellow Soldiers. During paving operations, large dump trucks hauling tons of asphalt are constantly moving in and out of the work area. It is up to another Soldier to ensure that the trucks are backed into position and their loads are dumped into the paver's hopper at the correct rate. Some Soldiers on the crew smooth the 300-degree asphalt with long rakes, called *lutes*, while others constantly monitor the depth and make adjustments to the screed. The screed is the back portion of the paver where the asphalt is pushed under, smoothing it out and setting the thickness.

Sergeant First Class Pickett is a member of the 350th Mobile Public Affairs Detachment, an Army Reserve unit from Indianapolis, Indiana.

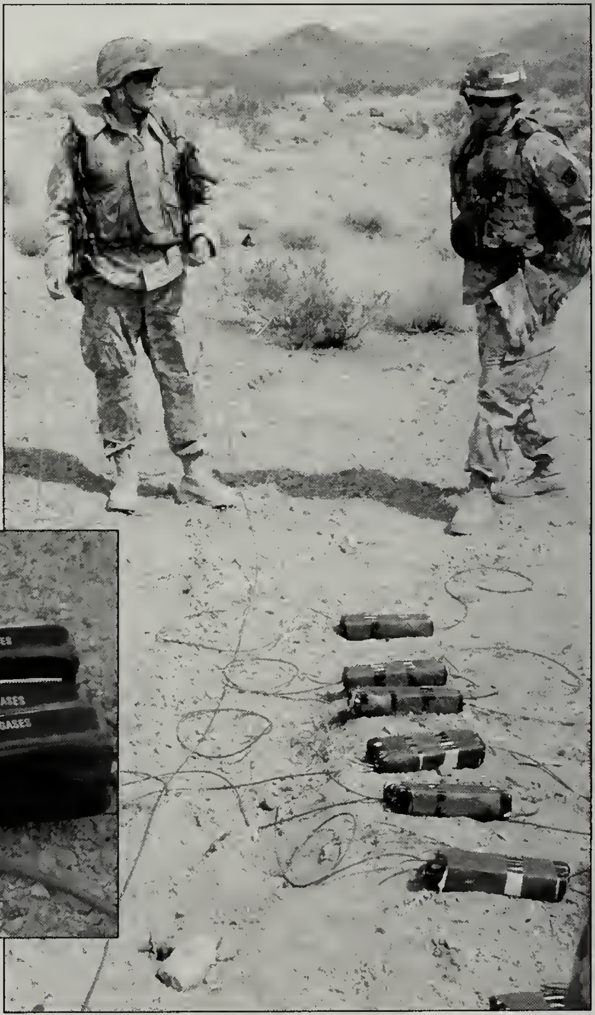


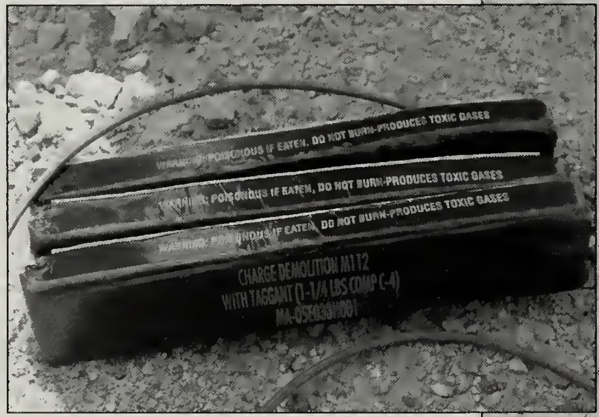
Engineers Send NTC Skyward

By Private First Class Christine Samples

The Soldiers of the 459th Engineer Company out of Bridgeport, West Virginia, sent large pieces of NTC airborne with C4, shaped charges, and cratering charges when they took advantage of an opportunity to practice basic familiarization and refresher training in demolition during Operation Sand Castle 2007. "Demo" does not have as high a priority as building bridges, so the Soldiers don't often have an opportunity to do it.

Each Soldier was issued three 1-pound blocks of C4, a pliable and versatile explosive that can blow up anything from a single door to a steel building, depending on how much is used. The first step in preparing C4 for detonation involved taping each Soldier's three blocks together and knotting them with detonation cord. Instead of burning, detonation cord




WARNING: POISONOUS IF EATEN, DO NOT BURN-PRODUCES TOXIC GASES
WARNING: POISONOUS IF EATEN, DO NOT BURN-PRODUCES TOXIC GASES
WARNING: POISONOUS IF EATEN, DO NOT BURN-PRODUCES TOXIC GASES
CHARGE DEMOLITION M112
WITH TAGGANT (1-1/4 LBS COMP C-4)

Far Right: Soldiers from the 459th Engineer Company survey a line of C4 bundles to make sure they are properly connected for the detonation.

Right: The 459th Engineer Company sent NTC airborne with the help of C4.

actually explodes, which then sets off the C4. Each Soldier then took his blocks downrange and connected them to other Soldiers' blocks with more detonation cord to create one huge blast. Well back from the blast site, at a safety area 500 meters away, the Soldiers watched as the C4 was detonated. For the engineer Soldiers in the safety area, the boom created by the C4 more than made up for the lack of flash. Even though everyone knew it was coming, the blast still caused more than one Soldier to jump.

After everyone had detonated C4, the Soldiers moved on to training with shaped charges and cratering charges, which are used to demolish construction or damage surfaces. All of the explosives had to be detonated before the unit could leave the demolition range. It was a long but beneficial day for the Soldiers.

Private First Class Samples is a member of the 350th Mobile Public Affairs Detachment, an Army Reserve unit from Indianapolis, Indiana.

Engineers Train As They Fight

By Specialist Matt Wisnieski

A Soldier first—that was the spirit instilled in United States Army Reserve Soldiers at NTC during Operation Sand Castle 2007. Soldiers trained to proficiently construct buildings, roads, and bridges, and along with that, they performed and succeeded in tactical training. The Reserve Soldiers traveled to Fort Irwin to upgrade existing facilities at NTC, the military's premier desert environment training center.

The Soldiers worked out of Forward Operating Base (FOB) Santa Fe, which was operated as if it were in a hostile area. Guards searched vehicles and also ensured the safety of Soldiers inside the wire. Outside the FOB, Soldiers wore full tactical gear, to include Kevlar helmets, body armor, ballistic eye protection, and individual weapons. Because of the hot, dry weather, plenty of water was also part of the uniform, either in canteens or in Camelbak® hydration packs.

Vehicles leaving the FOB were treated as if they were in a combat zone as well. As a safety precaution, convoys were used to ensure that no Soldier went into the combat zone alone. In response to security alerts, convoys had to have at least four vehicles with two Soldiers in each of them. During convoy missions, they learned to react to improvised explosive devices (IEDs), and when vehicles were stopped during missions, they pulled security along the roadside.

Security was important in other situations as well. A combat engineer from the 671st Engineer Company pulled guard duty along with his team during a reconnaissance mission. While his battle buddies took measurements for a future bridging mission, the 671st Soldier and his team were in the prone position providing overwatch for safety. While construction was taking place, engineer Soldiers pulled guard at the work sites. The Opposing Forces (OPFOR) made sure that the Soldiers were always on their toes. Dummy IEDs and mortar attacks replicated real combat situations. Soldiers had to react to the explosions as if they were real, taking cover, accounting for their fellow Soldiers, and securing the area.

While at NTC, engineer Soldiers became more proficient at their military occupational specialties, and they also became better Soldiers.

Specialist Wisnieski is a member of the 362d Mobile Public Affairs Detachment, an Army Reserve unit from Londonderry, New Hampshire.

CONSTRUCTING A DRY SUPPORT BRIDGE

By Specialist Matt Wisnieski and Private First Class Christine Samples

Two United States Army Reserve engineer companies from opposite sides of the country came together at NTC during Operation Sand Castle 2007. The 459th Engineer Company, a bridging unit from Bridgeport, West Virginia, brought a new dry support bridge (DSB) to replace the medium girder bridge (MGB) the unit had used in the past. The 671st Engineer Company, a bridging unit from Portland, Oregon, got a concentrated lesson from the 459th in constructing the new bridge.

The DSB can be constructed as two 20-meter bridges or a single 40-meter bridge. The 459th had set up the bridge only a few times in the past, but the situations were not tactical and thus not very realistic. The NTC rotation was a great opportunity to use the new system in a realistically tactical setting.

While the old MGB was a very labor-intensive system, taking many Soldiers a long time to construct, the DSB uses a hydraulics system and a crane to take the place of manpower. A trained eight-Soldier crew can put up the bridge within three to five hours. The new bridge is a completely modular system, designed by the British for the U.S. Army. The system is on the high end of technological advancements for bridge construction, and because of its complexity, the company had a two-week training session with British instructors when it acquired the bridge more than two years ago. That session of hands-on training with the designers of the DSB was a great training experience for the Soldiers. The training was done at a deliberate pace so that nothing was forgotten; however, since that training took place so long ago, the NTC rotation was a good refresher.

The training for the 671st Engineer Company was more abbreviated. The unit had a month's class compressed into four days. The Soldiers learned the different personnel roles needed to construct the DSB. The system requires three Soldiers to set pins in the bridge to ensure that the modules stay connected. Two more Soldiers stand on top of the truck and help the crane operator with clipping and unclipping the modules. Two Soldiers are also needed to be "tag liners," to guide and balance the modules being moved by the crane operator.

The hands-on training was conducted deep in the middle of NTC over a large crevice so advancing convoys would have a safe passage. It took six hours of hard work under simulated combat conditions. The

Photo by Specialist Mat Wisnieski

A Soldier helps assemble a dry support bridge during Operation Sand Castle.

Photo by Specialist Mat Wisnieski

A 459th Engineer Company Soldier leads a truck across the dry support bridge that the company just set up.

Photo by First Class Christine Samples

Members of the bridge crew with the 671st Engineer Company begin the breaking-down process of their dry support bridge after it was tested with tactical traffic.

Soldiers were very methodical in setting up the bridge to ensure that no steps were missed. Once the DSB was tested with tactical traffic, the bridge crew dismantled it. The new bridge went back to West Virginia with the 459th, but the 671st will get its copy of the bridge as the Army continues to upgrade and improve its equipment.

Specialist Wisnieski is a member of the 362d Mobile Public Affairs Detachment, an Army Reserve unit from Londonderry, New Hampshire.

Private First Class Samples is a member of the 350th Mobile Public Affairs Detachment, an Army Reserve unit from Indianapolis, Indiana.

Operation Sand Castle

Engineers Light Up Firing Range

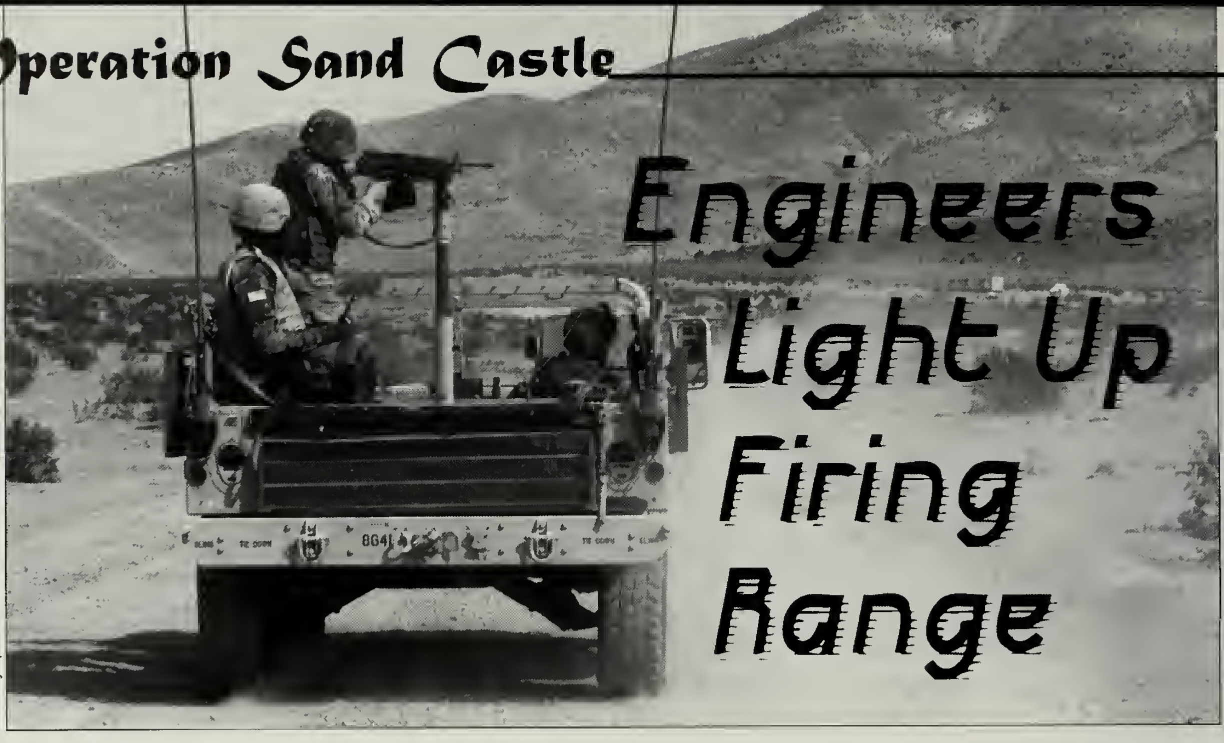


Photo by Specialist Matt Wisnieski

By Specialist Matt Wisnieski

As the convoy stopped, a hush fell over the nine Army vehicles. The reality of the situation set in as the four gun trucks tested their weapons systems. Soldiers looked forward a bit nervously to what lay before them. Ahead of the convoy was a city with more than a hundred enemy targets. Improvised explosive device (IED) attacks were expected. The Soldiers' task was to conduct a 20- to 30-minute assault on the city without injuring any civilians. Safety was the most important part of this mission. The Soldiers were technically proficient on their weapons and would need to rely on their training to get them through this assault. Suddenly, a cloud of dust washed over the convoy as it began to move.

Photo by Specialist Matt Wisnieski

A combat engineer Soldier teaches his fellow Soldiers how to correctly operate and clear the M-2. The class was conducted in preparation for a live-fire training exercise at NTC.

The assault was on a live-fire range at NTC, as part of the Soldiers' three-week annual training during Operation Sand Castle 2007. They had been working hard under tactical conditions—constructing bridges, buildings, and roads—while others supported these missions. The culmination of the exercise was the two-day weapons training.

The first day was spent teaching Soldiers to operate the M-2 .50-caliber machine gun and the M-249 squad automatic weapon (SAW). The training was invaluable because during a deployment, any Soldier might need to use these weapons. The familiarization was important to maintain the safety not just of individuals but of entire units. After the familiarization classes, Soldiers fired live rounds from both weapons, including a ball and tracer mix from the M-2.

The second day was the real test. Soldiers shot both blank and live rounds from moving vehicles at targets on the live-fire range. The training gave Soldiers a good idea of how to engage the enemy from a moving convoy. The landscape of the realistic range was rocky and included plastic sheep, shopkeepers in their stores, and families in their homes. IEDs exploded at various distances from the convoy along the course. Throughout the town, enemy targets were in hiding or out in the open. It was a great training opportunity that taught Soldiers how to react in situations when force is needed.

Specialist Wisnieski is a member of the 362d Mobile Public Affairs Detachment, an Army Reserve unit from Londonderry, New Hampshire.

ENGINEERS GO VERTICAL

By Private First Class Christine Samples

Alpha Company and Charlie Company, 458th Engineer Battalion, United States Army Reserve units out of Brookeville and Pittsburgh, Pennsylvania, learned new jobs during Operation Sand Castle 2007. The Soldiers of the two companies were tasked with building a number of pre-engineered buildings and concrete masonry unit (CMU) structures in three weeks. The challenge was that they had little or no experience with vertical construction before coming to NTC, because they were reclassifying from combat engineer military occupational specialties (MOSs) to jobs that support vertical construction. The urban city, Medina Jabal, being built at NTC was their learning site.

Operation Sand Castle gave the Alpha Company Soldiers a lot of tough training. With just four days to construct four CMU structures, the days started at about 0400. On some days, the Soldiers didn't get back to their forward operating base (FOB) until after the showers closed at 2300. That provided motivation for them to get their jobs done faster so they had time for hot showers.

The Soldiers didn't spend all their time building. Trips to and from the work site were delayed by attacks from the Opposing Forces (OPFOR) that were in place at NTC to help create a more realistic training environment. Before they started work for the day, the Soldiers also practiced clearing buildings that were already finished at the site. Clearing involved searching out hidden enemy forces and other hazards the OPFOR might have set up overnight.

Charlie Company engineers teamed up with the 461st Engineer Company out of Fargo, North Dakota, to begin working on a taped-off L-shaped area in the sand that would become a CMU structure. Since they had built roads during a deployment to Iraq, these Soldiers had experience in horizontal construction, but they too had never built structures that go up into the air.

The NTC training aimed to teach Soldiers what to expect during a deployment. The experience of those who had already been deployed was helpful when the company performed a convoy or pulled security, but their experience usually did not extend to vertical construction.

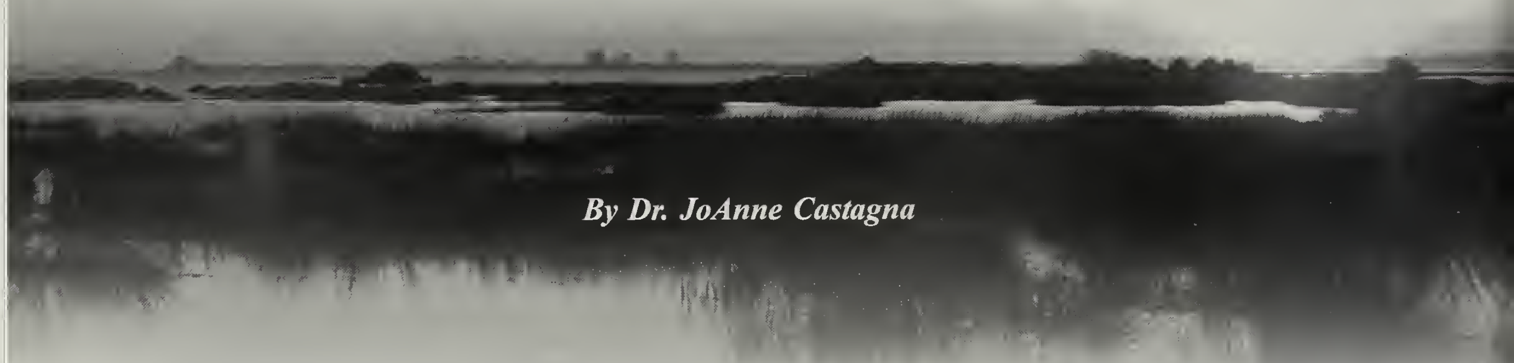
The transition of Alpha and Charlie Company's Soldiers to vertical engineer skills fits in with the Army's move to a more modular force. Engineer jobs are changing as the Army becomes more versatile and mobile. These Soldiers are taking the change in stride as they adapt and learn their new role in the Army.

Private First Class Samples is a member of the 350th Mobile Public Affairs Detachment, an Army Reserve unit from Indianapolis, Indiana.

A Soldier with Alpha Company, 458th Engineer Battalion, sets a cinder block down on fresh mortar on a CMU structure.

Photo by Private First Class Christine Samples

Environmental Restoration Is Possible



By Dr. JoAnne Castagna

An eighth grade student from Elizabeth, New Jersey, stands on a pier and carefully lifts a starfish from a water-filled glass aquarium as her classmates surround her. She shrieks as one of its arms breaks off. A biologist with the United States Army Corps of Engineers® quickly assures her that the arm will grow back and that the creature will be okay. The starfish is finally placed safely in its natural habitat in the Hudson River Estuary.

Hudson-Raritan Estuary

The students were taking part in the fourth annual Earth Day celebration sponsored in April by the Corps and other agencies on the Elizabeth Marina City Dock. The students learned that the nearby Hudson-Raritan Estuary, the starfish's home, could also be restored by keeping it pollution-free. It was a sunny, breezy day when more than 200 New Jersey students gathered on the dock overlooking the estuary. Corps experts explained to the students that an estuary is a partially enclosed coastal body of water with one or more rivers or streams flowing into it and with a free connection to the open sea.

Students learned about the effects of pollution on their environment from a number of Earth Day volunteers. They learned through a variety of interactive educational stations manned by scientific and educational experts. Glass touch tanks containing estuary marine life were featured, and demonstrations of pollution and water quality testing were conducted. The students also boarded a United States Coast Guard vessel for a tour and boarded the Corps vessel *Hocking* as it traveled near the estuary.

Photo by JoAnne Castagna, New York District, U.S. Army Corps of Engineers

Eighth grade students learn about starfish that live in the Hudson-Raritan Estuary.

Aboard the *Hocking*, Corps experts discussed the estuary's rich history, current condition, and the Corps's ongoing port activities and environmental restoration projects in the estuary, four of which were recently completed with much success. The estuary covers 16,212 square miles and surrounds the Ports of New York and New Jersey in a region populated by 20 million people. For more than 200 years, the New York District has managed the port's navigation, development, and maintenance and is one of the Corps's largest civil works missions. Over the decades, the salt marshes along the shores of navigation channels have experienced some degradation and habitat loss due to a number of factors, including increased boat traffic and years of commercial construction and development along the

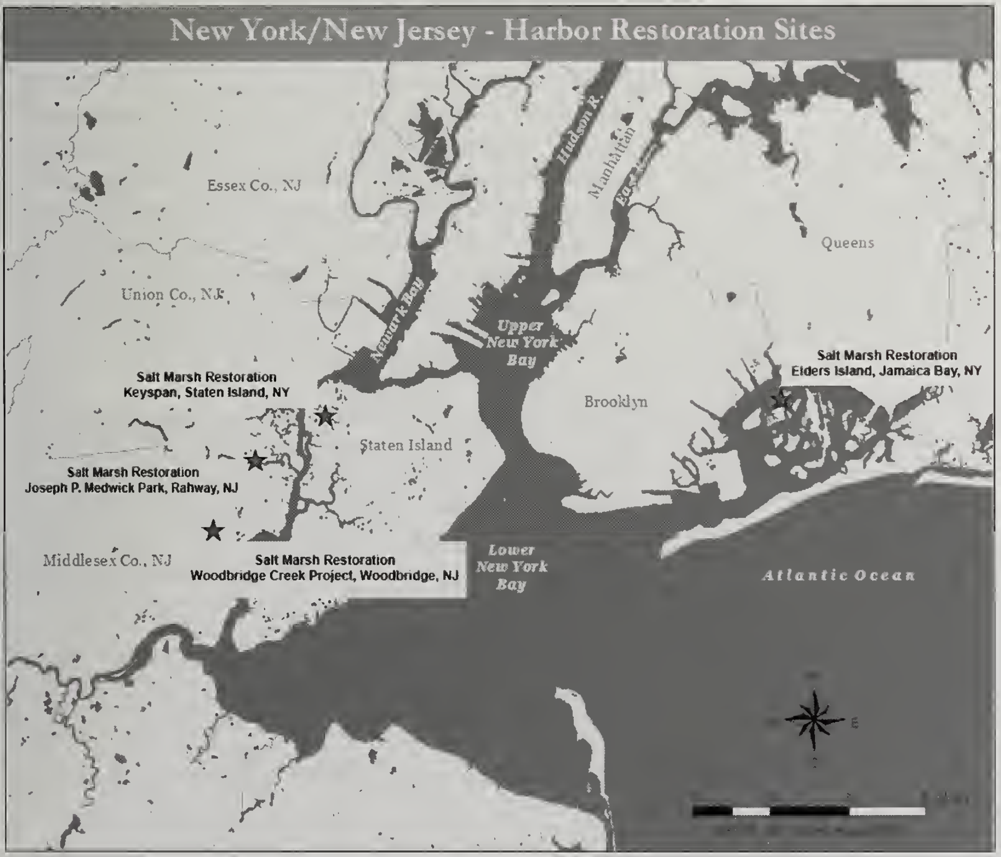
Photo by JoAnne Castagna, New York District, U.S. Army Corps of Engineers

Students board the *Hocking* for a tour of the estuary, where the Corps will be completing environmental restoration projects.

shore. To restore these areas, the Corps has an environmental restoration program in place. Maintaining the health of the estuary is important because salt marshes clean the water environment, reduce flood risks, and provide essential fish and wildlife habitats. Salt marshes are areas of land that are either covered by shallow water or contain waterlogged soil.

Salt Marsh Successes

In 2006, the New York District, in cooperation with the Port Authority of New York and New Jersey and state and local agencies, successfully completed four salt marsh restoration projects in the estuary that are preserving and restoring more than 143 acres of salt marsh.


New York/New Jersey - Harbor Restoration Sites
Essex Co., NJ
Union Co., NJ
Middlesex Co., NJ
Hudson R.
Manhattan
Newark Bay
Upper New York Bay
Lower New York Bay
Queens
Brooklyn
Staten Island
Atlantic Ocean
Salt Marsh Restoration Keyspan, Staten Island, NY
Salt Marsh Restoration Joseph P. Medwick Park, Rahway, NJ
Salt Marsh Restoration Woodbridge Creek Project, Woodbridge, NJ
Salt Marsh Restoration Elders Island, Jamaica Bay, NY
E

Elders Point Island, Jamaica Bay, New York

Located in the boroughs of Brooklyn and Queens, the easternmost areas of New York City, is the Jamaica Bay Gateway National Recreation Area. It is a popular park visited by millions each year and home to a variety of wildlife species, including migratory birds and fish nurseries. Since colonial times, 90 percent of the Jamaica Bay marsh islands have degraded and the remaining acres of islands are disappearing at a rate of 44 acres per year. That rate has grown faster in the last decade. If the islands are not restored, they will be completely lost within the next three decades. The Corps is successfully restoring these islands, including Elders Point Island, which is composed of

Photo by JoAnne Castagna, New York District, U.S. Army Corps of Engineers

The Corps restores a degraded salt marsh in Joseph P. Medwick Park on the Rahway River in New Jersey.

two separate islands—Elders Point East and Elders Point West—that are connected by mudflats. They totaled approximately 21 vegetated acres before the Corps's restoration. That restoration plan for Elders Point Island includes recontouring the land using dredged sand from various harbor channels and restoring the existing vegetation.

In the summer of 2006, 250,000 cubic yards of sand were pumped onto Elders Point East, and 700,000 plants were hand-planted, including salt marsh cordgrass, salt hay, and spike grass. Today, marsh grass is flourishing there, promoting the return of wildlife. The tentative schedule for Elders Point West is to place sand on the island next year and plant vegetation in 2009.

Keyspan, Staten Island, New York

One of the first salt marsh areas identified for restoration by the Corps was the nine acres of marsh adjacent to the Keyspan Corporation Facility in Staten Island, New York. In recent years, areas of the site have been overrun by an invasive species of common reed called *Phragmites australis,* which is a problem because its roots can grow very thick and high, preventing tidewater from penetrating the area frequently. Without a frequent tide, fish, shellfish, and other food sources for birds and mammals cannot exist.

The Corps removed the reed and 36,200 cubic yards of soil, graded the land to elevations suitable for native plants, and planted a diverse group of 107,000 native plants, including salt marsh cordgrass, salt hay, and marine shrubs. The plants provide a food source for fish and other marine life in the estuary and vegetation for nesting birds. Water flow to the area has been reestablished, improving the water and soil quality and promoting the return of native fish and wildlife.

Joseph P. Medwick Park, Rahway, New Jersey

The Corps decided to restore approximately 14 acres of salt marsh in the northern portion of Joseph P. Medwick Park along the southern shore of the Rahway River. Years ago, a berm was built on the banks of the Raritan River, cutting off the site from the daily tide. As a result, the area was overrun by *Phragmites australis.* The reed prevented a normal tide of water from flowing into the site, degrading the site and adversely affecting its fish nurseries and the birds and wildlife that live and breed there. The Corps removed the reed and approximately 30,000 cubic yards of soil, recontoured the land, and planted 270,000 plugs of native wetland plants, including salt marsh cordgrass, salt hay, and marine shrubs. The plants provide a food source for fish and other marine life in the estuary and vegetation for nesting birds. Water flow to the area has been reestablished, improving the water and soil quality and promoting the return of native fish and wildlife.

Woodbridge Creek Project, Woodbridge, New Jersey

Woodbridge Creek is a salt marsh with a diversity of vegetation and wildlife. In recent years, areas of the site have been overrun by *Phragmites australis.* As at the other sites, the reed prevented a normal tide of water, which has degraded the site and adversely affected its fish, bird, and wildlife habitats. The Corps restored approximately 23 acres of the marsh. In addition, approximately 8 acres adjacent to the site were restored in cooperation with the National Oceanic and Atmospheric Administration and the New Jersey Department of Environmental Protection. These additional acres helped to restore the land adversely affected by a 1990 oil spill. The restoration included removing soil from within the marsh, grading the land to make it suitable for native marsh vegetation to flourish, and replanting more than 240,000 marsh plants. The plants provide a food source for fish and other marine life in the estuary and vegetation for nesting birds. The project has restored the water flow to the site and now juvenile fish species are creating nurseries there, and bird and wildlife habitats are returning to the site.

Future Environmental Leaders

The Earth Day celebration was a great opportunity to energize the students, our future environmental leaders, about the health of their own estuary in the New York and New Jersey Harbor and help them understand the connection between land and water. It was an important part of the effort to encourage public support to maintain this resource as a world-class estuary.

For additional information about the New York District's Hudson-Raritan Estuary Program, visit <*http://www.nan.usace.army.mil/harbor/index.htm*>.

Dr. Castagna is a technical writer-editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

NEW WELL-DRILLING RIG ARRIVES IN DJIBOUTI

By Captain Jerord E. Wilson

It was like a prayer being answered when an eagerly awaited new well-drilling truck arrived at Camp Lemonier in Djibouti in May 2007 to be used by the 1132d Engineer Detachment. The North Carolina Army National Guard unit, working as part of the Combined Joint Task Force–Horn of Africa (CJTF–HOA), accepted the rig and performed preventive maintenance checks and services (PMCS) to identify any mechanical problems with the system and prepare the equipment for the difficult conditions it would face in Djibouti.

In the past, well-drilling equipment took a long time to set up and, because of the thick geological structure of the rock formations in Djibouti, the equipment was subject to severe maintenance problems. Those problems delayed the creation of much-needed wells because repair parts had to be ordered from the United States. The capabilities of the new equipment are impressive. It travels with two large trucks, and the drill can reach depths of more than 2,000 feet. It can use either 6- or 12-inch steel roller cone drill bits designed to chew through the toughest geological formations in Djibouti.

The new well-drilling truck is manufactured by the Laibe Corporation, Indianapolis, Indiana. A representative from the company spent several weeks at Camp Lemonier to train members of the 1132d on the equipment. Temperatures in Djibouti can reach 100 degrees by midmorning, and the increase in temperatures could have some effect on the operation of the equipment. The crew operating the new machine will have to take precautions against the effects of the heat on the equipment and on themselves as operators.

Previously, the equipment used by the 1132d took about a week to set up before drilling could even begin. To drill 100 feet with the old drilling rig could take a considerable length of time, depending on soil composition. The new drilling equipment can be set up and ready to drill in just one day. Also, the new rig can drill 100 feet in five hours, even in the toughest soil in Djibouti, increasing the number of wells that can be drilled at locations throughout the country.

The mission of CJTF–HOA is to prevent conflict, promote regional stability, and protect coalition interests in order to prevail against extremism. The CJTF–HOA organization began operations at Camp Lemonier on 13 May 2003. It works with partner nations on humanitarian assistance; disaster relief; consequence management; and civic action programs, to include medical and veterinary care, school and medical clinic construction, and water development projects.

Captain Wilson worked for the CJTF-HOA civil-military operations section until July. He is now back in the United States.

2007 Army Deployment Excellence Awards

By Mr. Henry H. Johnson

The Army's 2007 Deployment Excellence Award (DEA) winners received top honors and presentations from Lieutenant General James L. Campbell, Director of the Army Staff, on 5 June 2007, at the 3d Annual Chief of Staff Army, Combined Logistics Excellence Award Ceremony/Banquet hosted by Lieutenant General Ann E. Dunwoody, the Army's Deputy Chief of Staff, G-4, at the Hilton Alexandria Mark Center Hotel, in Alexandria, Virginia.

Lieutenant General Campbell congratulated the awardees on their outstanding achievement on behalf of General George W. Casey, the Army's Chief of Staff, before delivering the keynote address to an audience of congressional dignitaries, senior Army generals, senior executive civilians, and a host of Family members, Soldiers, and friends.

The DEA program is open to all Active Army, United States Army Reserve, and Army National Guard units or table of organization and equipment (TOE), table of distribution and allowances (TDA), or fixed military installations with a deployment or deployment support mission. Units and installations compete in one of five categories: large unit (battalion and above), small unit (company and below), supporting unit, installation, and operational deployment.

The *deploying unit category* recognizes units that have demonstrated the ability to actually conduct a deployment as evidenced in their nomination packet and verified by an on-site evaluation team. This category consists of two subcategories—a *large-unit category* for battalion-size units and above and a *small-unit category* for company-size units and below.

The *supporting unit category* recognizes units that have demonstrated the ability to support an actual deployment, as evidenced in their nomination packet and verified by an on-site evaluation team. Finally, the *installation category* recognizes fixed military installations or installation commands that have demonstrated the ability to support an actual deployment, as evidenced in their nomination packet and verified by an on-site validation/evaluation team. Units and installations prepare and submit self-nomination packets through command channels to their appropriate major command, where panels will select the best. The major commands send their nominations to a Department of the Army (DA)-level evaluation board conducted at Fort Eustis, Virginia. The DA DEA Board reviews and scores the nominations and determines semifinalists. DEA teams of deployment specialists visit the selected semifinalist organization locations for an on-site firsthand validation of unit deployment practices.

"I'd like to just say a few things about all of you award winners out there and the thousands of Soldier and civilian logisticians you represent. ... Actually, to be in the midst of the Soldiers and civilians who have received the equivalent of the Nobel Prize in logistics is pretty awesome. It's not every day that you are surrounded by some of the Army's finest logisticians and the best supporters in the world. ... Hooah!" – MG Stevenson

The *operational deployment category* recognizes large (battalion and above) and small (company and below) units for short-notice deployments in support of operational missions like the War on Terrorism, peacekeeping, or humanitarian relief operations, which is different from the program's original categories, in that units do not submit nomination packets but are instead evaluated on-site by a DEA observation team.

"It's not about the general who is out there in the sand and mud making the critical decisions at the point of the spear. It is ... and always has been, Soldiers and civilians, like you, that have gone beyond the call of duty to hone their tactical and technical skills ... building a strong foundation from which leaders can base future decisions— decisions which often have life and death consequences." – MG Stevenson

The DEA winners and runner-up unit commanders received the Army Chief of Staff's Star Note, distinguished plaque, and a distinguished shadow box with the Chief of Staff of the Army; the Sergeant Major of the Army; the Army Deputy Chief of Staff, G-3; the Army Deputy Chief of Staff, G-4; and the Chief of Staff Army Combined Logistics Excellence Award coins encased in a plush leatherette display box commemorating the unit's accomplishment. The unit awardees received a Star Note signed by the Deputy Chief of Staff, G-4; a three-night stay in the luxury Hilton Alexandria Mark Center Hotel and tours of the Pentagon, the Capital, and other places of interest in the Washington, D.C., area and received VIP guest seating at the "Twilight Tattoo"—a colorful military pageant held at the Jefferson Memorial. The awardees' celebration concluded with a banquet hosted by the Army Deputy Chief of Staff, G-4, in their honor that included the keynote speaker—Major General Mitchell H. Stevenson, Commanding General, United States Army Combined Arms Support Command and Fort Lee—and entertainment provided by the United States Army Chorale.

2007 Deployment Excellence Award Recipients

Category	Winner	Runner-Up
Active Large Unit	526th Brigade Support Battalion 2d Brigade Combat Team 101st Airborne Division (Air Assault) Fort Campbell, Kentucky	21st Combat Support Hospital Fort Hood, Texas
Active Small Unit	Headquarters and Headquarters Detachment 30th Signal Battalion Schofield Barracks, Hawaii	D Company, 7th Battalion 101st Aviation Regiment Fort Campbell, Kentucky
Active Support Unit	841st Transportation Battalion Charleston, South Carolina	838th Transportation Battalion Rotterdam, Netherlands
Army Reserve Large Unit	1188th Transportation Terminal Battalion Decatur, Georgia	1185th Transportation Terminal Brigade Lancaster, Pennsylvania
Army Reserve Small Unit	362d Tactical Psychological Operations Company Fayetteville, Arkansas	322d Maintenance Company Arden Hills, Minnesota
Army Reserve Support Unit	1190th Deployment Support Brigade Baton Rouge, Louisiana	1394th Deployment Support Brigade Camp Pendleton, California
National Guard Large Unit	53d Infantry Brigade Combat Team Pinellas, Florida	41st Infantry Brigade Combat Team Tigard, Oregon
National Guard Small Unit	B Company, 2d Battalion 218th Field Artillery Regiment McMinnville, Oregon	A Company, 1st Battalion 186th Infantry Regiment Medford, Oregon
National Guard Support Unit	Joint Forces Headquarters-Florida St. Augustine, Florida	Joint Forces Headquarters-Minnesota Little Falls, Minnesota
All Army Installation	Fort Bragg, North Carolina	Fort Hood, Texas
Operational Deployment Large Unit	Brigade Troops Battalion, 1st Brigade Combat Team, 3d Infantry Division Fort Stewart, Georgia	NA
Operational Deployment Small Unit	A Company, 15th Brigade Support Battalion 2d Brigade Combat Team, 1st Cavalry Fort Hood, Texas	NA

"The 21st century necessitates a highly versatile Army that can handle a diverse array of operations and missions, and so I encourage, and challenge, each of you in this room to continue the extraordinary work that clearly has set you apart from your peers." – MG Stevenson

The DCSLOG memorandum /letter of instruction (LOI) dated 19 April 2000, on the DEA website, outlines the DEA awards criteria and guidance. The DEA LOI contains detailed guidance/instructions for competing units and installations. The DEA checklist is an appendix to the LOI (pending release of AR 525-30, later this year). This guidance is available in Microsoft Word® format for online viewing or downloading from the DEA website *at <http://www.eustis.army.mil/deploy>.*

Significant dates for the 2008 competition are as follows:

- 1 December 2006 - 30 November 2007: Competition period; submit packets through command channels to major commands.
- 31 January 2008: Major commands' nomination packets are due to the DEA Program Manager.
- 4-15 February 2008: DEA Board convenes to evaluate unit packets and select semifinalists.
- 3-26 March 2008: DEA teams visit selected semifinalists' locations and conduct on-site validation of deployment and deployment support practices.
- April 2008: Winners announced via DA message.
- June 2008: DEA awards are presented at the Chief of Staff, Army Combined Logistics Excellence Award Ceremony/Banquet, Washington, D.C.

For additional information, contact the DEA Program Manager, ATTN: Mr. Henry Johnson, Building 705, Room 215, Fort Eustis, Virginia 23604, DSN 826-1833 or commercial (757) 878-1833.

Mr. Johnson, a retired command sergeant major, is the Deployment Excellence Award Program Manager at the Deployment Process Modernization Office, Fort Eustis, Virginia.

War Trophies of the Past

By Mr. Garry Hollands and Mr. Wil Nelson

The role of the United States Army combat engineer usually gains little press coverage, while the infantry and armor Soldiers often gather accolades for their endeavors. However, thirty-eight years ago in Vietnam, American combat engineers were engaged in the largest and most successful combat engineering feat of that long-ago war—one that tested all their skills and ingenuity and brought them recognition—Operation Horace Greeley. The operation involved the construction of Route 547—also known as the A Shau Expressway—from Hue across the steep jungle-covered mountains of the Ammonite Cordillera and into the infamous A Shau Valley.

The North Vietnamese Army (NVA) had captured the A Shau Valley in 1966, driving out the United States Special Forces from their camps at A Luoi, Ta Bat, and A Shau. Attempts by the 1st Cavalry Division, and then by the 101st Airborne Division (Air Mobile), to retake the Valley first failed in 1968, primarily due to poor weather. Lieutenant General Richard Stilwell, commander of XXIV Corps, and whose area of responsibility was I Corps Tactical Zone (the five northernmost provinces of South Vietnam), determined that an all-weather road would be constructed to bring armor, tracked artillery, and supplies to support infantry actions sweeping the Valley. To achieve this tactical necessity, engineers of the 45th Engineer Group, 18th Engineer Brigade were gathered in March 1969 to form Task Force Tiger. Led by the 27th Engineer Battalion (Combat) out of Gia Le Combat Base, south of Hue, the task force also included the following units:

- 59th Engineer Company (Land Clearing)
- 511th Engineer Company (Panel Bridge)
- 591st Engineer Company (Light Equipment)
- 630th Engineer Company (Light Equipment)
- C Company, 1st Engineer Battalion, Army of the Republic of Vietnam (ARVN)
- 2d Platoon, A Company, 14th Engineer Battalion (Combat)
- D Company, 14th Engineer Battalion (Combat)
- 1st Equipment Platoon, D Company, 87th Engineer Battalion (Construction)

This 85-millimeter ammunition was discovered while clearing the jungle beside Route 547 in Vietnam.

Soldiers display a Russian 85-millimeter fieldpiece captured near FSB Blaze.

The task force's mission was to—

- Construct 55 kilometers of Route 547, a heavy-duty, two-lane, all-weather road from Fire Support Base (FSB) Bastogne to FSB Blaze, and a one-lane, all-weather road to FSB Rendezvous in the A Shau Valley.
- Construct necessary bridging.
- Construct two FSBs.
- Make tactical improvements to Route 548 in the A Shau Valley.

Operation Horace Greeley supported the 101st Airborne Division's Operation Massachusetts Striker and Operation Apache Snow, which included the infamous battles of Dong A Tay (Bloody Ridge) and Dong Ap Bai (Hamburger Hill). The engineers began Operation Horace Greeley on 20 March 1969 and constructed the road to allow the armor of the 3d Squadron, 5th Cavalry Regiment, to reach the Valley in May. Operation Horace Greeley officially ended on 29 September 1969, in preparation for the monsoon season.

A critical part of the road construction was the clearing of the jungle for 200 meters on both sides of the road to help prevent ambushes. The 59th Engineer Company (Land Clearing), with its 30 Rome plows, accomplished this portion of the mission. In doing so, the Rome plows uncovered large amounts of enemy equipment, bunkers, ammunition, and weapons. Numerous small trucks, most of them destroyed by earlier air attacks, were also uncovered. While clearing vegetation along Route 458 in the A Shau Valley, the 59th discovered a Russian bulldozer that the NVA had abandoned when it fled the Valley in May 1969. The dozer had a broken clutch, so the Soldiers towed it along the perilous one-lane road carved through the steep mountains from FSB Rendezvous to FSB Cannon. There it was placed on a lowboy trailer and hauled back to Gia Le. This dozer was of American design but had been manufactured in a factory shipped to Russia during World War II as part of the Lend-Lease Program.

Back at Gia Le, the dozer was repaired and made operational. (See sidebar, page 42.) The dozer's clutch throwout bearing was replaced with one from a five-ton dump truck. That replacement would not be surprising, given the Army's habit of using common parts in many vehicles over a long period of time. That the dozer was an exact replica of an American Lend-Lease dozer was evident from the numerous nameplates copied on various parts of the equipment, including one on the right-hand side of the engine block. The casting duplicated everything—including the fasteners that secured the plate to the engine block—except the lettering and numbering on the nameplate.

Of more significance was the discovery in the Rao Ninh Valley of three buried Russian 85-millimeter artillery pieces, complete with cleaning equipment and ammunition. Buried nearby were three small stake-bed trucks that may have been used to pull the artillery. It was rumored that these cannons were loaded and a few rounds sent into Laos. At that time, these were the first artillery pieces captured by engineer Soldiers since World War II. One of these guns was shipped by Major General William T. Bradley, then commander of United States Army Engineer Construction Agency, Vietnam, to Fort Leonard Wood, Missouri, where

Engineers inspect a Russian bulldozer captured in the A Shau Valley.

it is on display at the Engineer Museum. Another was lost en route to Fort Belvoir, Virginia, and the third was presented to the mayor of Hue. It was probably recaptured by the NVA when Hue fell in 1975.

Of the many heroes of the Vietnam War, the combat engineers who drove the Rome plows stand out near the top. These young men operated their powerful machines on dangerously steep slopes, pushing down vegetation full of poisonous snakes, stinging insects, and occasional mines and snipers. They pulled guard duty every night, then went out each morning and worked all day in the oppressive heat, risking their lives at every turn.

Mr. Hollands, a first lieutenant during his tour in Vietnam, was the battalion intelligence officer until June 1969. Then he served as a platoon leader and the executive officer of C Company, 27th Engineer Battalion (Combat).

Mr. Nelson, who was a captain, served as the 27th Engineer Battalion maintenance officer from mid-January to mid-December 1971.

Bamboo to Blue:

Army Engineers in Vietnam Refurbish a Captured Bulldozer

By Mr. Harold Walden

In 1969, a new engineer equipment mechanic was assigned to the maintenance section of the 27th Engineer Battalion (Combat) at Gia Le, near Hue in South Vietnam. while constructing Route 247, American Soldiers happened upon an abandoned Russian-made bulldozer in the A Shau Valley. One of the battalion's lowboy trailers brought the little dozer—about the size of a Caterpillar D6—into the maintenance driveway, where it was off-loaded. A former operator had constructed bamboo-and-leaf additions to make the bulldozer more comfortable. It was surprising that anyone could have spotted the camouflaged machine in the middle of dense forest.

The new Soldier, just a couple months out of mechanic school, was designated to work with a more seasoned mechanic to refurbish the dozer. Immediately, they began to undo all of "Charlie's" skilled bamboo home improvements. Although the Russian manufacturers used metric nuts and bolts, the Soldiers made their tools work. They did extensive rebuilding of the gasoline pony motor used to start the diesel engine. They replaced the clutch with one from a five-ton dump truck, installed new batteries and a starter, cleaned the fuel injectors and fuel pump, lubricated all the zerk fittings, and changed all the fluids and filters. Finally, they tightened the track. They cranked up the pony motor and engaged the clutch. To their amazement, the bulldozer started up and ran.

The warrant officer who supervised the maintenance operation wanted to make a big impression on the battalion commander, so he got some powder blue paint and the bulldozer got a shiny new coat. When a new battalion commander arrived soon after, the captured equipment played a special role. The outgoing commander reviewed the troops from atop the powder blue dozer, while the lead mechanic drove his pride and joy.

Mr. Walden was a private first class fresh from mechanics training at the United States Army Engineer School at Fort Belvoir, Virginia, when he helped salvage the captured bulldozer at Gia Le.

Book Review

Falcon Brigade: Combat and Command in Somalia and Haiti, by Lawrence E. Casper (Colonel, USA, Retired). Lynne Rienner Publishers: Boulder, Colorado, 2001, 278 pages, ISBN: 978-1-55587-945-7, $35.00 (hardcover)

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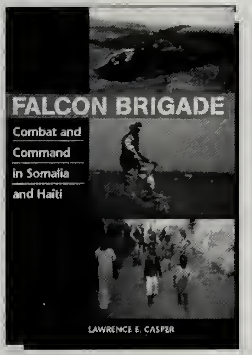

Falcon Brigade covers the United States involvement in two modern military operations—Somalia and Haiti. These actions were in the "new" era of military commitments that involve "nation building" and intervention aimed at stabilizing regions rather than straightforward military ends. This work describes what it is like to be in command of a combat unit in this scenario.

Casper's tour as the Falcon Brigade (Aviation Brigade, 10th Mountain Division) commander during these two deployments provides us with a unique comparison between the interventions in Somalia and in Haiti. He shows us the stark contrast between the misguided, underarmed, underarmored, and uncoordinated United Nations efforts in Somalia and the overwhelming application of force used to quickly restore order in Haiti.

Anyone who has read *Black Hawk Down,* about the 3 October 1993 battle in Mogadishu, knows that it was a horrific action that was saved from complete disaster only by the discipline, esprit, and training of those who fought. Casper brings a unique perspective to that battle. As the Quick Reaction Force commander, he literally overflew the battle as it raged.

Then just six months after returning from Somalia, Casper and the Falcon Brigade were aboard the *USS Eisenhower,* preparing to air-assault the 10th Mountain Division troops onto the shores of Haiti during Operation Uphold Democracy. Casper recounts the frustrations and challenges of brigade Soldiers working around the clock for thirty days.

This is an outstanding book, strongly recommended for professional development and informative reading for students of modern military operations. Written by one who was there, Casper shares many leadership lessons learned as well as giving a Soldier's perspective of what happened.

Reviewed by Mr. Jeffrey L. Rosemann, an Instructional Systems Specialist with the Officers Training Development Division, Department of Instruction, United States Army Engineer School. A retired infantry Soldier, Mr. Rosemann also served as the 2d Infantry Division historian during the beginning of the 50th Anniversary of the Korean War.

• • • • • • *The Engineer Writer's Guide* • • • • • •

Engineer is a professional-development bulletin designed to provide a forum for exchanging information and ideas within the Army engineer community. We include articles by and about officers, enlisted Soldiers, warrant officers, Department of the Army civilian employees, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to engineers. Articles may share good ideas and lessons learned or explore better ways of doing things.

Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. Text length should not exceed 2,000 words (about eight double-spaced pages). Shorter after-action-type articles and reviews of books on engineer topics are also welcome.

Include photos (with captions) and/or line diagrams that illustrate information in the article. Please do not include illustrations or photos in the text; instead, send each of them as a separate file. Do not embed photos in PowerPoint. If illustrations are in PowerPoint, avoid excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi. Images copied from a website must be accompanied by copyright permission.

Provide a short paragraph that summarizes the content of the article. Also include a short biography, including your full name, rank, current unit, and job title; a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime telephone number.

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Send submissions by e-mail to <*leon.engineer@conus.army.mil*> or on a 3 1/2-inch disk or CD in Microsoft Word, along with a double-spaced copy of the manuscript, to: Managing Editor, *Engineer Professional Bulletin*, 364 MANSCEN Loop, Suite 2661, Fort Leonard Wood, Missouri 65473-8926.

Note: *Please indicate if your manuscript is being considered for publication elsewhere. Due to the limited space per issue, we usually do not print articles that have been accepted for publication by other Army professional bulletins.*

Engineer Update

Transition from ARTEP/MTPs to CATS. The U.S.Army has transitioned from using the Army Training and Evaluation Program (ARTEP) mission training plans (MTPs) as a collective training tool to using the combined arms training strategy (CATS). A CATS is a unit training strategy which, as an entity, takes the entire training planning process from the cradle to the grave. A CATS is developed from a unit's base table of organization and equipment (TOE) and Department of the Army-approved mission statement. They are designed using the training model of crawl-walk-run. Commanders will make the final determination as to which tasks should be trained and at what level the training should begin, since they will know their unit's training status. Included in CATS are the required training resources such as Class III and Class V materials and training aids, devices, simulators, and simulations (TADSS). The current ARTEP/ MTPs that are located on the Reimer Digital Library (RDL) are scheduled to be removed from the RDL (TBD). CATS are located on Army Knowledge Online (AKO) on their own dedicated page. The planned end state is movement of CATS to the Digital Training Management System (DTMS) once it is fully fielded. Additionally, the Collective Training Division of the United States Army Engineer School developed a website on the Engineer Portal that will also have links to CATS and files available for download. The following links will take you to the AKO CATS site and to the Engineer Portal.

AKO CATS Link: <*https://Army Knowledge Online*>.

Engineer Portal Link: <*https://www.mwu.army.mil/portal/eng/index.php*>.

The point of contact at the Engineer School Collective Training Division is <*donald.durst@us.army.mil*> or call (573) 563-6237.

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Engineer Doctrine Contact Update. As of 15 August 2007, the Engineer School's Doctrine Division was consolidated at the Maneuver Support Center (MANSCEN) level to the MANSCEN Directorate of Training (MDoT) Doctrine Division. The Engineer Doctrine element still retains the lead for the Regiment's doctrine with only a few minor changes in physical locations and contact information.

The mailing address for written correspondence has changed to: Commandant, United States Army Engineer School, ATTN: ATZT-TDD-E, 320 MANSCEN Loop, Suite 220, Fort Leonard Wood, Missouri 65473-8929.

The telephone numbers remain the same: Doctrine Chief, (573) 563-8161; Senior Doctrine Analyst, (573) 563-7332 (DSN prefix, 676-).

The generic NIPR e-mail address for electronic correspondence has changed to <*leon.mdottddengdoc@conus.army.mil*>.

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Engineer School Lessons Learned Integration (L2I) Cell. The United States Army Engineer School L2I Cell needs your help. To keep training, doctrine, and combat developments current and to prepare for the future, it is critical that the school continuously receive relevant engineer observations, insights, and lessons (OIL). The L2I analyst can derive information from a variety of sources: unit after-action reports (AARs); tactics, techniques, and procedures (TTPs) used by units in and returning from theater; Soldier observations/submissions to the Engineer School; and requests for information (RFIs). This information is used to conduct doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) gap analyses and to determine solutions. These solutions are distributed to the Engineer Regiment via new doctrine and training products, *Engineer* (The Professional Bulletin of Army Engineers) and other publications, websites, and by answering RFIs. With the modular transformation in full swing, many engineer units are looking for sample tactical standard operating procedures (TACSOPs) for the new units being established. You can help by forwarding any of these materials from your unit's deployment to the L2I analyst. Unclassified information can be sent to <*paul.a.zacher@us.army.mil*>. Classified information can be sent by secure Internet protocol, routed (SIPR) e-mail to <*paul.a.zacher@us.army.smil.mil*>. For more information, call (573) 563-5340.

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2007 Engineer Unit Directory. The 2007 United States Army Engineer Unit Directory is available online in Adobe PDF format at <*http://www.wood.army.mil/engrmag/Engr%20Unit%20Dir/2007Directoryonline.pdf*>. Since many unit addresses have changed recently, take a moment and see if your unit's listing is correct. Changes to the Unit Directory can be made by calling (573) 563-7644 or e-mailing <*leon.engineer@conus.army.mil*>.

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Clear The Way

By Brigadier General Gregg F. Martin
Commandant, United States Army Engineer School

Maggie and I are thrilled and thankful to return to Fort Leonard Wood, Missouri. We are honored, privileged, and humbled to be joining such an effective and enthusiastic team! I thank and honor Major General Jack Sterling and his wife Cathy for their great service and for providing such an excellent transition. On behalf of the entire Regiment, we wish the Sterlings all the best in their new senior leader role in Korea. I also acknowledge, honor, and thank each of my predecessors in this job – great leaders whose tremendous vision, work, and shoulders continue to carry us today and into the future.

One of the keys to success within our Regiment is effective communication. I welcome and encourage members of the Regiment to provide direct feedback and recommendations to me and my staff that will help improve our Regiment and Army. I greatly value your input, and am wholeheartedly and passionately committed to being an advocate for our Regiment. I can be most effective with your support and feedback.

As you know, our Regiment is ascending from "the trough" of Transformation, to include addressing engineer support within the brigade combat teams (BCTs). An awesome amount of work has been done to ensure that we are providing effective engineer support to the Force. We have an exceptional team of leaders involved who are absolutely the right people to work this challenging business. Please trust in them, as do I, to do the very best possible in support of our Regiment and Army. I ask for your patience and commitment as we realize the effects of Engineer Transformation, especially within the engineer force pool over this next year.

I ask for the support of commanders and leaders to ensure that we maximize development, training, education, and career progression opportunities for our Soldiers and leaders, despite the demands of ongoing operations. It is imperative that we invest in them now to ensure our success both now and in the future. Last quarter, we announced the addition of the Explosive Ordnance Clearance Agent (EOCA) Course to Fort Leonard Wood. The first course graduated on 21 December 2007. The Soldiers who attend this four-week course are awarded the E8 Additional Skill Identifier (ASI), in recognition of their critical skills and knowledge. I very much recognize and appreciate the challenges that leaders and commanders face as they prepare and care for Soldiers and Families about to deploy. My goal, and that of the entire Engineer School, is to assist you in developing and training your Soldiers. We are committed to doing all we can to help you achieve this end.

Recently, I had the privilege of recognizing one of our outstanding engineer Soldiers, the late Corporal Kory D. Wiens and his specialized search dog (SSD), Cooper (K-154), who made the ultimate sacrifice in defense of our great nation. The team deployed to Iraq on 31 December 2006 in support of Multinational Division–Central. They saved numerous coalition and Iraqi lives by detecting explosives and materials for manufacturing other improvised explosive devices (IEDs). Kory and Cooper were killed by an IED while performing a dismounted patrol on 6 July 2007 in Muhammad Sath, Iraq. The Kory D. Wiens Veterinary Hospital and Dog Kennel was dedicated at Fort Leonard Wood on 4 December 2007. It will provide current and future engineer canine handlers with state-of-the-art facilities to support our teams. The facility provides 36 new kennel runs for the dogs, making it the largest kennel in FORSCOM.

As we fight today's wars, I request that you capture your unit histories, AARs, lessons learned, exit interviews of key leaders, and other important documents and send them to Dr. Larry Roberts at our Engineer History Office. This historical record is crucial to our learning and improvement.

As we begin the new calendar year, I ask each of you for your renewed emphasis on Safety. Sadly and inexcusably, Soldiers, Civilians, and Family members of our Army are injured and killed in circumstances that are entirely avoidable. It is incredibly disheartening to know that members of our team are injured or killed due to not wearing seatbelts, driving at reckless speeds, using cell phones while operating motor vehicles, and driving under the influence. Collectively, we can reduce and eliminate our injuries and losses and redirect the available time to celebrating the service, sacrifice, and achievements of our people. THINK SAFETY – PLEASE!!!

Our deployed Soldiers, Civilians, and their Families are always in our thoughts and prayers. Thank you all for your service and sacrifice.

ESSAYONS! Army Strong!

Lead The Way

By Command Sergeant Major Clinton J. Pearson
United States Army Engineer School

Greetings from Fort Leonard Wood! One of the most significant events here recently was bidding farewell to a member of our great command team, MG John Sterling and his wife Cathy. I would like to express my sincere appreciation to the Sterlings for the positive impact they made on Fort Leonard Wood, the Regiment, and the Army. We welcome BG Gregg Martin as the new Commandant of the Engineer School, and his wife Maggie, and look forward to serving with him and his family.

Our Regiment is experiencing one of the most challenging, dynamic, and rewarding periods in its history. The selfless service and sacrifice of our Soldiers, Civilians, and Families in support of the War on Terrorism is exemplary and a true testament to their commitment to defending freedom and our way our life.

The past year has brought huge positive impacts on our support of the Army's missions. We have blended the powerful capabilities of the Reserves, National Guard, and Active Army to provide a very responsive capability and function for our nation. The success of the Engineer Regiment transformation to the modular force is mainly due to the aggressiveness of the leaders throughout the Regiment and our great Corps.

The entire Regiment is on schedule with transforming to the modular force. The Reserves and National Guard are on pace to transform years ahead of schedule, and the Active Army engineers have passed the halfway point toward transformation to the modular force. Recently, the 8th Engineer Battalion (Combat Effects), 54th Engineer Battalion (Construction Effects), and 84th Engineer Battalion (Construction Effects) became modular units, which increases the capabilities available to the combatant commanders. Additionally, the activation of modular engineer units increases the opportunities for Soldiers throughout the Regiment. For example, the number of senior noncommissioned officers (NCOs) selected for promotion on the recent sergeants major list far exceeded previous years' numbers. Congratulations to all on your achievement!

The noncommissioned officers courses continue to focus on improving performance today while building tomorrow's sapper leaders. We continue to aggressively support resetting Army Force Generation (ARFORGEN) units though a blend of resident, distance learning, and mobile training teams. We will continue to focus on building skills that support the brigade combat team (BCT), interim brigade combat team (IBCT), and Stryker brigade combat team (SBCT) commanders and the modular engineer units. The engineer Advanced Noncommissioned Officers Course (ANCOC) and Basic Noncommissioned Officers Course (BNCOC) are continuing to provide the Regiment's NCOs with the professional development and current task-based rigid training needed to lead today and tomorrow. We continue to improve in our 72-hour situational training exercise (STX), which allows NCOs to share their deployment experiences with each other. The exercise serves as a culmination of all tasks covered during the course, with emphasis on troop-leading procedures (TLP) in the current and contemporary operating environment.

BNCOC also places a significant emphasis on TLP and the execution of route clearance, traffic control point, cordon and search, force protection, access control, and quick-reaction force (QRF) missions. All missions are enhanced through the incorporation of improvised explosive device (IED) simulators, realistic training aids, and civilians on the battlefield.

The Counter Explosive Hazards Center (CEHC), the Army's Center of Excellence for countering explosive hazards, is training and updating the force in current counter explosive hazards techniques and employment of commercial off-the-shelf (COTS) and contingency equipment. This instruction enables units to receive theater-specific training prior to deployment and allows them to focus on the mission during transfer of authority. To ensure that the training is up to date and relevant, the CEHC gathers the latest intelligence on explosive hazards tactics, techniques, and procedures (TTP) employed by the enemy as well as TTP developed by deployed units to counter that threat.

We are continuing our efforts to bridge the gap with explosive ordnance disposal (EOD), as the Explosive Ordnance Clearance Agent (EOCA) Course moves to Fort Leonard Wood this quarter. This move will increase our ability to find new solutions and provide better training for engineer Soldiers.

Finally, continue to focus on the War on Terrorism, maintaining high standards and leading the way as engineers do. May God bless the fallen comrades and keep watch over all Soldiers, Families, and Civilians as we continue the fight.

Like No Other:

The Battering Rams in Operation Iraqi Freedom

By Lieutenant Colonel William H. Graham, Major Jason A. Kirk, and Major Gary D. Calese

Like no other. This phrase certainly characterizes the year-long tour that the 40th Engineer Battalion "Battering Rams" recently completed in Operation Iraqi Freedom (OIF). It was like no other in that this formation—fighting organically to the 2d Brigade Combat Team (BCT), 1st Armored Division (1AD)—is one of the Army's last two maneuver BCT-supporting Engineer Reconstruction Initiative (ERI)–Modified Table of Organization and Equipment (MTOE) combat engineer battalions in the Army. (The other is the Schweinfurt, Germany-based 9th Engineer Battalion.) It was like no other in that the Soldiers of the battalion and brigade headquarters served the first half of their tour stationed at Camp Buehring, Kuwait, assigned as the first-ever Central Command (CENTCOM) "theater reserve brigade." It was like no other in that the battalion spent time shepherding the sapper companies through their precommitment engineer-focused training as they deployed into Iraq attached to their habitually supported maneuver task forces. The battalion then evolved into a sort of brigade troops battalion, with administrative control (ADCON) over the brigade's separate military intelligence, signal, military police, and reconnaissance troops. Finally, the battalion served in Baghdad with operational control over one of the modular "Echo" companies of sappers from a 4th Infantry Division combined arms battalion maneuver task force, a civil affairs company, the BCT's reconnaissance troop, an explosive ordnance disposal (EOD) company, and the battalion's headquarters company, while retaining ADCON of the military intelligence and reconnaissance troops. This like-no-other script was one that none of the Battering Rams could have written as they conducted their predeployment gunnery and mission rehearsal exercise in the fall of 2005. While much of the year that concluded in November 2006 was like no other, the experiences and lessons learned of the 40th provide valuable information for other engineer formations across the Engineer Regiment.

An engineer from the 40th Engineer Battalion uses a Bobcat® to construct a sewer network at FOB Falcon.

The 40th had three highly trained sapper companies that deployed ready to conduct engineer tasks across the full spectrum of combat and stability operations, and a proficient and flexible staff that could plan and command and control a variety of missions across their supported BCT's battlespace. This article will detail the experiences and share the lessons learned by the 40th as it planned, prepared, and executed full-spectrum operations. The battalion's guiding philosophy was to approach all missions in a disciplined and aggressive manner. The battalion's motto—*Constructio et Destructio* (Construction and Destruction)—characterizes the breadth of engineer and nonengineer missions its Soldiers would face during OIF.

Engineer LOOs

The 40th command group used its base mission-essential task list to refine a template of engineer lines of operations (LOOs) to guide training efforts during the predeployment mission rehearsal exercise and the training time that presented itself when the battalion was designated as the CENTCOM theater reserve brigade in Kuwait. Nested within the BCT's effects-based operational construct, the 40th prepared to conduct nine LOOs.

The 40th Engineer Battalion emplaces countermobility barriers in Ameriya, Baghdad.

BCT Effect No. 1—Promote a safe and secure environment.

Engineer LOO No. 1. Conduct counter improvised explosive device (counter-IED) operations. Finding and training ways to counter the IED threat—the primary killer on the OIF battlefield—was paramount. The summation of the 40th's counter-IED lessons follows:

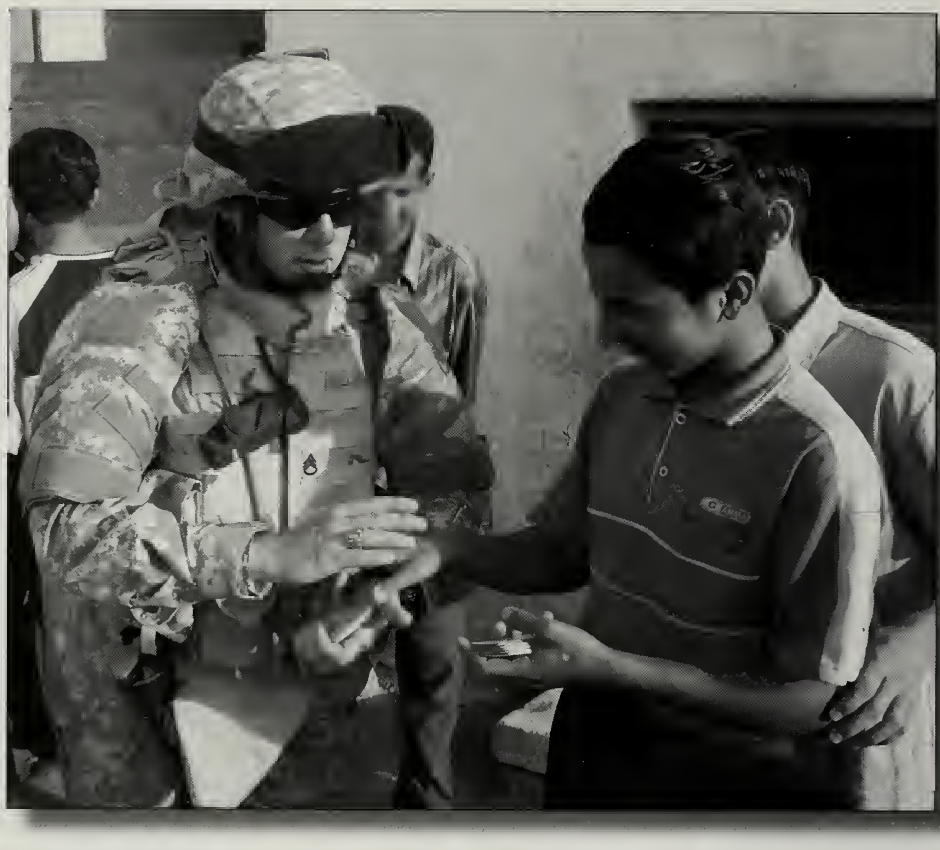
- Make every Soldier an IED detector by training multiple iterations with a variety of concealed IEDs.
- Make sappers the counter-IED experts for the supported maneuver element. During training time in Kuwait, 40th Engineer Battalion noncommissioned officers (NCOs) and lieutenants advised maneuver task forces on the development of counter-IED training lanes.
- Develop a counter-IED "Red Team" to support training at both the command and staff levels and at the crew and platoon levels. The battalion dedicated an opposing force element within the engineer reconnaissance platoon to build and employ a wide variety of training IEDs during counter-IED lane training for the entire BCT.
- Synchronize, synchronize, synchronize. The 40th provided command and control for the BCT's EOD response and escort operations.
- Use Fort Leonard Wood's Counter Explosive Hazards Center and other "schoolhouse" training courses such as—
  - The Route Reconnaissance and Clearance Course for valuable hands-on time with Buffalo armored personnel carriers, RG-31 mine-protected vehicles, and Husky mine detector vehicles.
  - The Route Reconnaissance and Clearance Course–Sapper for counter-IED TTP for units without the clearance equipment package.
  - The Explosive Ordnance Clearance Agent (EOCA) Course to train NCOs and junior officers in skills that help bridge the gap between sappers and their EOD brethren.
- The 40th had operational control of the 754th Ordnance Company (EOD) and responsibility for EOD response across the BCT area of operations (AO). This facilitated the most expeditious response and a centralized means to prioritize response to IEDs, weapons caches, and blast crater analysis.

Engineer LOO No. 2. Collect, secure, and destroy unexploded ordnance (UXO) and captured enemy ammunition.

- The 40th trained on the TTP for these engineer tasks. Although the two companies stationed in Al Anbar Province completed a few disposal missions, the primary lesson learned was that EOD forces took on the majority of these missions. Related to LOO No. 1, the 40th emphasized the utility of passing the details of all recovered IED-making materials to the BCT's S2/counter-IED fusion cell.

Engineer LOO No. 3. Conduct force protection assessments, construction, and upgrades to critical coalition forward operating bases (FOBs) and combat outposts and to critical Iraqi municipal and other governmental facilities and infrastructure sites.

- All three line companies, the battalion staff, and the headquarters company engaged in this critical task.
- As a "force protection planner," the battalion S2 officer conducted site assessments across the BCT AO and made detailed perimeter barrier and entry control point upgrade designs for these sites. Charlie Company and the support platoon from Headquarters and Headquarters Company designed and emplaced combat outposts for use by American and Iraqi security forces.



A 40th Engineer Battalion Soldier distributes claim cards in southwest Baghdad. The cards allow Iraqis to seek reimbursement for damages caused by coalition forces.

Engineer LOO No. 4. Maintain trafficability of main supply routes (MSRs) and other critical lines of communication (LOCs).

- For this LOO, the 40th maintained the BCT's situational awareness of the status of MSRs and alternate supply routes (ASRs), then focused counter-IED route clearance patrols, blast hole repair missions, and sometimes counter-IED reconnaissance with the BCT's reconnaissance troop to address the most hazardous routes.
- Both the S2/counter-IED fusion cell's tracking of IED hotspots and maneuver task force requests for support helped to focus support efforts for these mobility missions.

Engineer LOO No. 5. Provide general engineering support to FOB life-support infrastructure and quality of life improvements.

- The 40th learned two primary lessons in conducting this traditional engineer LOO. First, the modernized Kipper™ tool kits proved highly valuable. The MTOE should authorize not one, but three Carpenter's Power Tool Kits (Line Item Number [LIN] (W34511) and three Pioneer Manual Labor Tool Kits (LIN W48074) per company. The Kipper Plumber's Tool Kit and Electrician's Tool Kit (LIN W49033 and LIN W36977) also were useful to combat engineers establishing combat outposts (COPs) at austere sites.
- The other lesson learned was that due to the shortage of Army construction units, the high demand for missions that civilian contractors couldn't perform, and the lack of general engineering capability in the divisional (or BCT) engineer units, many BCT-level general engineering missions were delayed until sufficient division- or corps-controlled assets became available. To fill this gap, some BCT engineer units scrounged available theater-provided equipment (TPE). The 40th's recommendation is to add a minimal level of general engineering equipment, such as two bucket loaders, a D7 bulldozer with haul asset, and three 5-ton dump trucks (or palletized load system vehicles with dump modules) to the combat engineer battalions. This would give the BCT tremendous flexibility and serve as a base for additional capability if sufficient TPE is available. These upgrades would allow the ever-flexible engineer Soldiers to apply their skills to provide valuable quality of life and force protection to forces at FOBs and COPs.

BCT Effect No. 2—Promote Iraqi confidence in their government.

Engineer LOO No. 6. Evaluate and improve Iraqi municipal infrastructure—sewage, water, electricity, academics, trash, and medical (SWEAT-M).

Engineer LOO No. 7. Enable and empower a capable and credible Iraqi government.

By conducting LOOs No. 6 and No. 7, the 40th played a critical role in the BCT's effort to build faith among the Iraqi people that their government can provide essential services such as clean water, electricity, and sanitation. The primary lessons learned follow:

- Incoming units must understand the personalities within the AO's governance and public works structure, the tribal leaders, the current status of SWEAT-M services, and the status of ongoing infrastructure projects. Civil affairs units—often on staggered or "off-cycle" rotations from the maneuver BCTs—are an important source for this information. The credibility of U.S. forces is diminished when they are not familiar with the status of ongoing projects and local priorities. While a new unit may feel the urge to jump into its area with quick solutions, it will be more useful to true progress to spend time learning how systems operated under the Saddam regime, what coalition efforts have already been attempted, and what long-term solutions are currently in the works.
- The 40th Engineer Battalion commander, like most brigade troops battalion commanders in adjacent BCTs, served as the BCT commander's lead agent for BCT-wide civil-military operations (CMO) efforts. The lesson learned is that much will be gained in establishing relationships with the interagency players, especially the United States Agency for International Development (USAID) and the United States Army Corps of Engineers® (USACE), that have ongoing projects within the AO.
- The approach to CMO responsibilities evolved over the course of operations. They found much success by running a "nonlethal effects working group," chaired by the BCT executive officer (XO), to synchronize CMO efforts along with information operations (IO), psychological operations (PSYOP), public affairs, and other nonlethal targeting operations. The brigade fire support officer led the IO, PSYOP, and public affairs sections while the battalion XO led the brigade civil-military affairs section and the infrastructure project management section.

BCT Effect No. 3—Transition to a democratic and independent Iraq.

Engineer LOO No. 8. Train Iraqi army EOD personnel in IED defeat.

Engineer LOO No. 9. Train Iraqi army engineers.

The battalion's Bravo and Charlie Companies conducted a significant number of combined operations with Iraqi Security Forces (ISF) from the National Police and Iraqi army. Contrary to their predeployment assumptions, the 40th was paired with standard "line formations" instead of Iraqi EOD or engineer personnel. All U.S. units in Iraq will work with ISF, applying persistence and patience as they work toward the objective of putting the ISF in the lead. Predeployment Arabic language and culture training and formal exercises working through interpreters helped prepare the 40th for these combined operations.

Summary

This LOO construct is similar to the one developed in 2005 and details how the battalion's initial planning and training efforts compared to the actual mission sets that the 40th was called on to execute.

While the battalion's deployment met with successes and failures, it reports that having predeployment training guided by a broad set of engineer LOOs and supporting tasks was extremely valuable. Additionally, the engineer task proficiency focus provided by engineer battalion leaders during the predeployment and theater reserve status training time helped prepare the battalion for the broad spectrum of engineer and nonengineer missions it was called on to perform. All of these formations report that training for the counter-IED fight as an engineer mobility mission will make not only the engineer companies, but also their task forces and the BCT, more successful. As the Battering Rams prepare for their next operational commitment, they will draw on the lessons of this most recent and *like no other* OIF rotation.

Lieutenant Colonel Graham served as commander of the 40th Engineer Battalion "Battering Rams" during this OIF rotation. He is now the Division Engineer for the 1st Armored Division (1AD), as he prepares for his third OIF rotation. His past assignments include tours of duty with the 1AD Engineer Brigade; the USACE Pittsburgh District; and the 588th, 1st, and 23d Engineer Battalions.

Major Kirk was the 40th Engineer Battalion executive officer during this OIF rotation and now serves as the 2d BCT/1AD executive officer. He has also served with the USACE New Orleans District and the 299th and 11th Engineer Battalions.

Major Calese was the 40th Engineer Battalion operations and training officer during this OIF rotation and now serves as the battalion executive officer. He has also served with the Sidewinders Team at the National Training Center, Fort Irwin, California; the 52d Engineer Battalion; and the 565th Engineer Battalion (Provisional).

Full-Spectrum Bridging Operations in Iraq

By Second Lieutenant Scott D. Eshom

Part of the Mabey-Johnson bridge is pulled down with two D7 dozers.

With Operation Arrowhead Ripper only weeks away, insurgents targeted and successfully rendered a key regional bridge impassible with a vehicle-borne improvised explosive device (VBIED). Located north of insurgent hotbed Baqoubah, the bridge had served as a passageway over the Diyala River. Operation Arrowhead Ripper, part of the larger Operation Phantom Thunder, was an overall offensive to clear insurgent-held cities, maximizing the surge capabilities of coalition forces. With passage over the Diyala River limited, elements of Task Force Lightning and other forces preparing for cordon-and-search operations in Baqoubah could not effectively carry out their mission. The 502d Engineer Company (Multirole Bridge) and elements of the 92d Engineer Battalion (Combat) (Heavy) answered the call for assistance.

The mission was simple: deploy an assault float bridge (AFB) and improve the near- and farshore approaches to permit traffic access to the temporary bypass. Knowing the urgency of the mission, elements of the 92d prepared for the movement and site work during the night. The operation was broken into three phases: movement to the site and nearshore preparation to provide access for the 502d bridge assets; bridge emplacement; and farshore preparation, roadwork completion and testing, and movement back home.

Although the 502d emplaced the bridge, the most demanding phases of the operation required the improvement of both shores and the construction of a roadway. Soldiers

Photo by Second Lieutenant Nicholas Soroka

Soldiers from the 502d Engineer Company use a bridge emplacement boat to stabilize the new bypass bridge while it is being anchored. A HYEX on the far shore works to improve the approach.

A D7 dozer clears the roadway, pushing the damaged Mabey-Johnson bridge into the Tigris River.

from the 92d Headquarters Support Company, the 502d Support Platoon, and Bravo Company provided construction and earthmoving assets and immediately started work on the nearshore approach. D7 dozers and graders worked nonstop for 24 hours to improve the trail running parallel to the existing highway and the bridge structure. After several hours of hard work, the noncommissioned officer in charge deemed access to the near shore of the existing bridge sufficient. Hydraulic excavator (HYEX) operators began improving the slope and approach of the river bank to provide 502d bridge assets ample room to maneuver and launch their improved ribbon bridge (IRB) bays and boats.

Soldiers from the 502d's 2d Platoon worked overnight to emplace the IRB bays needed to bridge the gap. Once ready to cross, D7 dozer operators began work on the far side to complete access to the highway. The skilled HYEX, grader, and dozer operators of the 92d worked around the clock to clear concrete debris off the dirt path, widen and fill areas with several dump truck loads of gravel, and level out the approach from the bridge on the far shore.

To ensure that the new road and bridge were effective, site leadership required a test run. Operators loaded up heavy equipment pieces to mimic the standard convoy that uses the bridge. With successful passage across the intersections leading off and onto the highway, the improved road, and the bridge, the Soldiers who contributed to the mission knew they had done something special. Military convoys immediately began to use the new road and bridge, and days later, Operation Arrowhead Ripper kicked off.

Coordination with the 92d's engineer assets was an important factor in mission success. With knowledge of the bridge site needs of the 502d, site leaders effectively directed ground operators on worksite priorities. Knowledge of military vehicle turning requirements led to a successful test run with sharp turns off and onto the highway. And when the initial mission was complete, the 92d responded to an urgent order to clear the damaged Mabey-Johnson bridge from the existing concrete bridge. Winched to the hulking 70-ton Mabey-Johnson bridge, two D7 dozers successfully cleared the roadway, and the 502d's 1st Platoon replaced the Mabey-Johnson bridge. The implementation of full-spectrum bridging operations by the 502d Engineer Company and the 92d Engineer Battalion enabled both the successful execution of Operation Arrowhead Ripper and the long-term assured mobility needs of the region.

Photo by First Lieutenant Brad Stubblefiel

The 502d's 1st Platoon pushes a replacement Mabey-Johnson bridge across the gap in the Al Taji Bridge over the Tigris River.

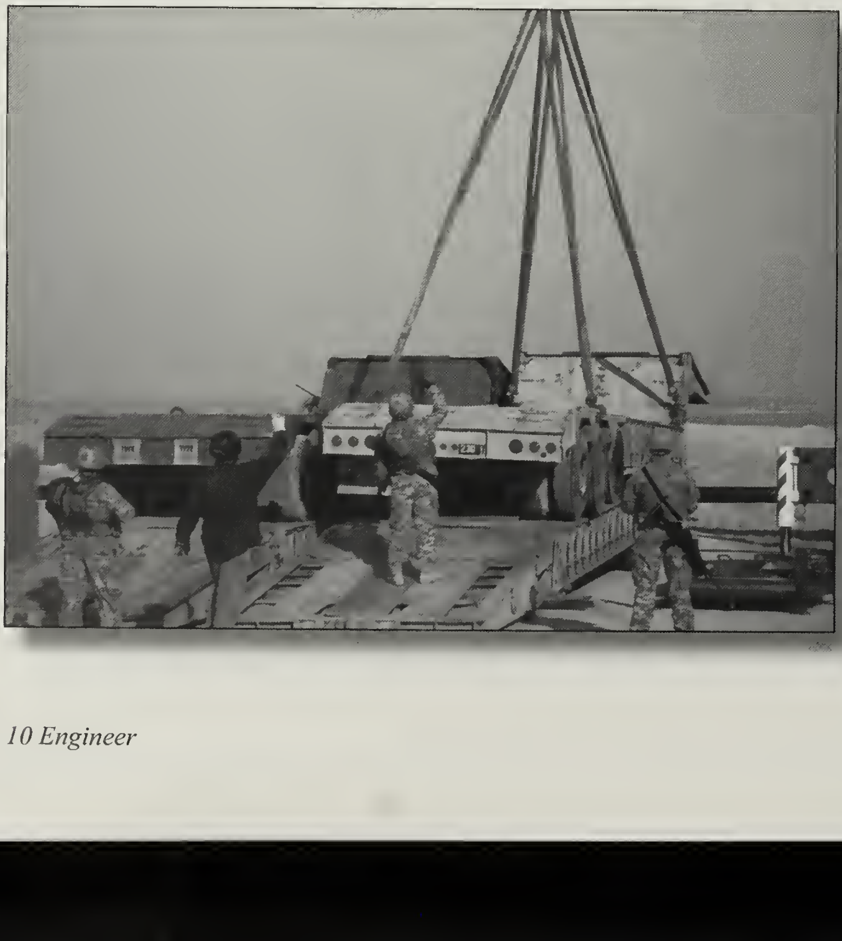
Second Lieutenant Eshom is the support platoon leader for the 502d Engineer Company (Multirole Bridge), Hanau, Germany. He completed the Sapper Leader Course in February 2007 after the Engineer Officer Basic Course at Fort Leonard Wood, Missouri. He holds a bachelor's in international relations and French studies from American University, Washington, D.C.

Breech From Kuwait To Iraq

By First Lieutenant Joshua Blalock

Engineers must solve many problems before any project or mission can start. The 186th Engineer Company's Task Force Denali overcame a unique problem during a mission to clear the new convoy route from Kuwait to Iraq during April and May 2007. The problem was that the task force needed to cross a 39-inch pipeline that runs the entire length of the border between Kuwait and Iraq. The Kuwaiti government owns the pipe and would allow it to be cut the day traffic started moving on the new route, but no earlier. Even though the government had approved the route, it did not want the pipe cut prematurely, and coalition convoys could not roll on the new route until two turnarounds were built and eight culverts had been cleared. The 186th would be responsible for breeching the border and meeting the route clearance requirements. The bulldozers, scrapers, and graders needed by Task Force Denali to clear the new route had to cross the border, but could not simply jump 39 inches to get across the pipeline. A delay in opening the new route would have meant five more months of using the previous convoy route, which travels near two cities in Iraq that pose a tremendous and constant threat to U.S. forces. A delay would mean putting Soldiers in undue danger.

Several solutions were considered. One option was to build an earth ramp that would cover the pipe and road and slope enough to allow vehicles to drive over it. This would call for a bulldozer to push dirt high enough on the road to clear the top of the pipe. A second option involved backing two M870 lowboy trailers against each



Two lowboy trailers, each loaded with another lowboy trailer, were hauled to the site.

Cranes set HMMWVs on the Iraqi side of the pipeline for the security platoon.

other over the pipeline. A third option was to take one M870 lowboy trailer and back it against the pipe while building an earth ramp on the other side. The fourth option was to cross into Iraq on Main Supply Route Tampa and take a long detour to get to the new route.

With each potential solution came additional problems. Earth ramps on both sides of the pipe would use a crane to place a bulldozer on the far side of the pipe to push dirt. The amount of dirt required would leave large holes. This option could also leave holes in the asphalt when the bulldozer was working to build the ramp, and all the dirt from the ramp would have to be removed before the route opened. The third option would also use dirt that would need to be removed. The last option would take too much time and would also put the engineers on the much more dangerous route. Thus, it was decided that the best option was to use the M870 lowboy trailers to form a bridge into Iraq.

The noncommissioned officer (NCO) in charge of the mission used 16 Soldiers from 2d Platoon for the breeching mission. The idea for using the trailers still needed to be tested to make sure it would work. With help from the maintenance platoon, the NCO and his team measured the height of the trailers to ensure that they would sit high enough to clear the obstacle. The Soldiers backed two trailers against each other and took measurements—each stood exactly 39 inches at its crest. The next step was to ensure that the trailers could withstand the weight of the engineer equipment being driven across them. The trailers would have to hold the weight of the equipment plus the weight of the truck hauling the equipment. The test proceeded without a hitch.

Now other problems came to light. The engineers did not want to disturb the pipe at all, but the trailers backed against the pipe left a gap. They used rubber matting, sand bags, and ¾-inch steel plating to cover the gap across the pipe. The next problem was the fact that the trailers would be sitting directly on the asphalt. Rubber matting was placed beneath the drop necks of the trailers to protect the road. Wood braces sat directly underneath the trailers to prevent their suspension system from giving under the weight of the equipment. The last concern was that the trailers themselves might shift and roll into or away from the pipe. A trailer's brakes will lock once the trailer is detached from a truck, but they are only designed to hold as equipment is driven onto the trailer, not while having that equipment loaded onto another truck and driven across. The Soldiers for the breeching mission used chains to hold the trailers in place against each other and the pipe.

The first convoys on the new route were scheduled for 15 May, so the breeching mission was set for 16 April to make sure the engineers crossing the border would have enough time

Braces underneath the trailers prevented their suspensions from giving when traffic crossed.

to construct the turnarounds and clear the required culverts. Four lowboy trailers were placed to ensure that there would be enough room for traffic to cross. The two cranes for the mission were a military 22T crane and a civilian 50T crane. Two lowboy trailers, each loaded with another lowboy trailer, were hauled to the site. Cranes set high-mobility multipurpose wheeled vehicles (HMMWVs) on the Iraqi side of the pipeline for the security platoon. Then the cranes moved two lowboy trailers to the Iraqi side of the pipeline and set them as close to the pipe as possible without damaging it. Rubber matting was placed beneath the trailers, and sandbags, matting, and steel plates were set into place on the pipe. The crew left a 1-foot gap between the side-by-side trailers to give them room to shift safely. Chains were attached only to the outside portions of the four trailers to help the brakes hold them in place. Steel plates covered the holes in the trailers where the hookup and chains are kept. Braces underneath the trailers prevented their suspensions from giving when traffic crossed. Sandbags were placed at the bottom of each ramp to allow the equipment an easier way to drive onto the bridge. The completed bridge measured 106 feet long and 17 feet wide, which was enough space for any equipment to cross. The breech took two hours to complete and allowed the security platoon to cross back into Kuwait without having to be picked up by a crane.

The Soldiers crossed the border and completed the safer route for convoys going in and out of Iraq. The pipe was then cut, the temporary bridge removed, and the new route opened on time, thanks to the leadership, teamwork, and the "never quit" attitude of these engineers.

First Lieutenant Blalock was deployed as a platoon leader with the 186th Engineer Company (Combat Support Equipment) in support of Operation Iraqi Freedom. He holds a bachelor's in physical education, teaches physical education at Headland Elementary School, and coaches high school football and baseball in Headland, Alabama.

Military Review
2008 Writing Competition

For the 2008 General William E. DePuy Special Topics Writing Competition, *Military Review* seeks original papers on "Actions Required to Attain Overall Objectives in the Aftermath of Combat Operations." Submissions should be from 3,500 to 7,000 words and should be unclassified, carefully researched papers on any topic examining issues related to post-combat operations. Previously published papers, or papers pending consideration for publication elsewhere, are ineligible.

Winners, who will be announced in July 2008, will receive the following:

- 1st place: $1,000, featured publication in a future edition of *Military Review,* and a certificate.
- 2d place: $750, publication in *Military Review*, and a certificate.
- 3d place: $500, publication in *Military Review,* and a certificate.
- 4th place: $250, special consideration for publication in *Military Review*, and a certificate.
- Honorable mentions: $100, consideration for publication in *Military Review,* and a certificate.

Papers should be submitted with an enrollment form via e-mail, or in hard copy with a CD, not later than 2 June 2008. Send e-mail submissions to <*milrevweb@conus.army.mil*>. Mail hard copies with CDs to *Military Review,* 294 Grant Avenue, Fort Leavenworth, Kansas 66027-1254. For more details—to include a copy of the enrollment form, criteria for judging, and a list of potential topics—visit *Military Review* online at <*http://usacac.army.mil/CAC/milreview/index.asp*>.

For other information concerning the competition, contact the managing editor of *Military Review* at (913) 684-9330 or DSN 552-9330 or via e-mail at <*leav-milrevweb@conus.army.mil*>.

Planning a New FOB in Afghanistan

By Second Lieutenant Michael P. Carvelli

Moving a unit to a new forward operating base (FOB) requires extensive logistical coordination that must be in place before the move can occur. Classes of supply, services, and contracts have to be extensively planned, pre-positioned, and synchronized in order to expose Soldiers to the minimum amount of risk with the greatest probability of success. The commander and staff must balance residual risk with the effects achieved.

At the staff level, the executive officer coordinates between all staff sections—to include the operations and training (S3) section and a representative from the occupying company or platoon—in order to achieve this coordination and solve preoccupation issues. Each section has an important role in assisting with assessing the terrain, forecasting classes of supply with an emphasis on construction materials, coordinating ground and air movements, and emplacing the necessary contracts to achieve success.

The intelligence officer and topographic engineers have a wide array of intelligence, surveillance, and reconnaissance assets, giving the commander a template to plan the footprint of the FOB or combat outpost. Some of these assets not only display the topographic map but also assist in range fans, observation post emplacement, and other vital areas typically forgotten during staff planning. Also, the S3 air should be included in the map reconnaissance to suggest possible landing zones and drop zones for container delivery system (CDS) bundles, medical evacuation, and rotary-wing resupply operations.

If the site has already been selected by the unit on the ground, an initial physical reconnaissance should be conducted. Suggested personnel for this reconnaissance include engineers, the unit supply (S4) sergeant or S4 representative, and current pathfinder- or jumpmaster-qualified Soldiers or Airmen familiar with the certification paperwork for landing zones and drop zones. This allows the initial setup of the landing zone and drop zone; logistical forecasting emphasizing construction materials; a tentative outline of force protection measures; and some staff-level familiarity with the soil conditions, water table, and terrain.

> *"The intelligence officer and topographic engineers have a wide array of intelligence, surveillance, and reconnaissance assets, giving the commander a template to plan the footprint of the FOB or combat outpost."*

After the initial site has been selected, a contingency real estate support team (CREST) needs to be coordinated to legally secure the land. However, in the reconnaissance of this site, the reconnaissance team must set the conditions for success through negotiations with the local leaders and populace. Initial discussions with the local populace can provide the CREST with a toehold from which to launch their operations.

Once the initial reconnaissance has occurred and the land has been approved, the S4 and engineers need to generate a supply request for triple-strand concertina, HESCO Bastion

Afghani contractors fill sandbags for use at the new FOB.

Concertainers®, dimensional lumber, plywood, sandbags, tents, and power generators, which are needed immediately for the Soldiers or engineers performing the initial construction. These materials allow a perimeter, observation posts, entry control points, and a tactical operations center to be constructed. And due to the current operating environment, bunkers to protect Soldiers from indirect fire and small arms fire should be incorporated into the initial construction phase. In addition, meals, ready to eat (MREs); bottled water; and fuel need to be requested for the occupying unit.

The engineer is responsible for determining where the fill material will be obtained for the HESCO barriers and sandbags. Since not all engineer units in Afghanistan are used in their typical roles, the brigade engineer company or attached engineer units may not be available to perform these construction tasks. If the soil conditions prevent the use of in-situ soil due to its poor characteristics, or if there is a lack of engineers or heavy equipment, the unit's contracting officer will not only have to coordinate the fill material requirements but may be required to contract heavy equipment such as bucket loaders, hydraulic excavators (HYEXs), and dump trucks.

If these contracts cannot be immediately attained, the money needs to be dedicated. Under the supervision of a contracting officer, a field ordering officer (FOO) can use cash to make small purchases locally, which can help offset the lack of contracts. Large amounts of fill material (over 1,000 cubic meters), heavy equipment contracts for extended periods of time (over 10 days), and dimensional lumber and plywood cannot be purchased from the local economy. After spending the money for local purchases, there is a one- to two-week process to clear the paperwork, fund, and redraw money.

Once the staff has completed the reconnaissance and a logistical forecasting and contract process has been initiated, a realistic occupation timeline can be created for the occupying unit. These three elements provide the commander with a feasible, realistic plan to construct and occupy a new FOB. However, coordination of ground and aerial resupply routes; movement of construction materials; and contracts for local labor, equipment, and fill material must be coordinated and synchronized for the unit's occupation.

Second Lieutenant Carvelli is the Task Force Engineer, Special Troops Battalion, 173d Airborne Brigade. He was previously assigned to Alpha Company, 554th Engineer Battalion, Fort Leonard Wood, Missouri. He is a graduate of the Engineer Officer Basic Course and the United States Army Ranger School and holds a bachelor's in civil engineering technology from the Rochester Institute of Technology.

BCKS

U.S. ARMY

BATTLE COMMAND KNOWLEDGE SYSTEM

Knowledge Management for the Base Camp Community of Practice

By Major Travis (TJ) Lindberg and Mr. Albert M. Vargesko

> *"A good company idea in tactics is likely to remain confined to one company indefinitely, even though it would be of benefit to the whole military establishment..."* [1]
>
> *—S.L.A. Marshall, 1947*

> *"...whereas the flow of knowledge within a business process is (1) easier to determine and (2) easier to optimize, it is the flow of knowledge between business processes, the interfaces between different organizational units and topics that might provide the highest potential for innovation and competitive advantages."* [2]
>
> *—Ronald Maier, 2004*

There are a handful of well-known and widely used standards and references to manage the design, construction, operation, maintenance, and retirement[3] of base camps[4] (such as Red Book, Sandbook, Assistive Technology [AT] Planner, Theater Construction Management System [TCMS], and Geographical Base Engineer Support Tool [GeoBEST]). However, there is no single Department of Defense (DoD) standard or authoritative body that addresses the life cycle tasks or funding issues related to base camps, and if you visit 20 forward operating bases in Iraq, you will find 20 different designs. For efficiency and standardization, it makes sense to share knowledge of construction, operations, and maintenance of base camps. This article describes the initiative started at the United States Military Academy (USMA), West Point, New York, and how it progressed to the creation of a knowledge management (KM) collaboration website that is now maintained by the United States Army Engineer School.

Building Knowledge

The Department of Systems Engineering at USMA became interested in studying military base camps as a real-world example of a system students would be immersed in early in their military careers. After the fall of the Berlin Wall and the collapse of the Soviet Union, the U.S. military increased the pace and reach of its operations. Military units now routinely deploy worldwide to fight wars, participate in peace enforcement and peacekeeping missions, train foreign armies, and respond to humanitarian crises. To support these operations, the military develops temporary base camps, which are complex systems with many integrated components that follow a life cycle pattern and thus provide an excellent educational opportunity for students of systems engineering.

Base Camp Workshops

Between 2001 and 2005, the USMA Department of Systems Engineering and the Department of Civil and Mechanical Engineering—in conjunction with the United States Army Corps of Engineers® (USACE) Engineer Research and Development Center (ERDC)—conducted a series of annual workshops to bring together practitioners from the Base Camp Community of Practice (CoP). The 2001 workshop identified that the CoP was indeed wide and varied and that the issues facing it were extensive.

The next workshop was held in March 2004, and the theme was "Base Camps of Today and Tomorrow." The workshop forum solicited input from the diverse Base Camp CoP regarding these fundamental domains of base camp study: initial planning, site selection, environmental issues, structures, power supply, and force protection. The forum was useful for information sharing; however, the lessons were short-lived because there was no continuous means to keep the Base Camp CoP together.

At the third workshop, held at West Point in May 2005, researchers and practitioners with recent field experience in developing and running base camps focused on sharing best practices among the Base Camp CoP. Three key issues were identified:

- DoD needs to simplify the funding processes for base camp development.
- DoD and the Services need to establish organizations as proponents for the Base Camp CoP.
- A system is needed that allows Base Camp CoP members to share knowledge related to the life cycle management of base camps and Joint forward operating bases (JFOBs).

To address the third issue, USMA initiated a study to determine the requirements for a KM system that could be used by the larger Base Camp CoP to help military units better understand base camp life cycle management-related tasks. The intent was to complete the study before the fourth workshop in May 2006 in order to present the findings and begin the implementation of the KM system at that time.

At about the same time, the Engineer School volunteered to host the 2006 workshop in St. Louis, Missouri, as part of the 2006 ENFORCE Conference. And the School offered to serve as the Army's proponent for base camp-related issues, thereby effectively addressing the second (and probably most significant) issue affecting the Base Camp CoP. Three important results came from the 2006 workshop:

- The Battle Command Knowledge System (BCKS), an existing Army system, was chosen to host a Base Camp CoP or "forum."
- The name of the collaboration site, "ArmyBaseCamp/JFOB.net," was chosen.
- The Engineer School was identified to provide the leaders and administrators to populate the database and maintain the website.

Collaboration Site

Becoming a member of the ArmyBaseCamp/JFOB.net professional forum is simple, although it requires an Army Knowledge Online (AKO) account. Logon to the BCKS website at <*https://bcks.army.mil* > and use your AKO account to enter. Click on the Professional Forums tab on the bar across the screen, and select Participate on the left to create a BCKS account. Select the ProtectionNet forum at the left of the screen, and there you will find a forum for ArmyBaseCamp/JFOB.net.

The site currently has 13 topics that contain a lot of information on base camps. Briefings, interviews, documents, books, best practices, or policies can be placed under any one of the 13 topics. What makes this more than just a database is that real collaboration is possible. Collaboration can begin by any member starting a discussion or making a comment. Contributions can be made at any time, and uploading documents is easy. Basic administration of the website is performed by BCKS contractors, and site maintenance is performed by the Engineer School Directorate of Environmental Integration.

Promoting and advertising the system is necessary to make it well known throughout the Army, and conducting assessments is necessary to ensure that it's worthwhile and provides value. So logon to BCKS, become a member of the ArmyBaseCamp/JFOB.net professional forum, and start contributing.

Major Lindberg recently served as an instructor in the Department of Systems Engineering, United States Military Academy, at West Point, New York. He served in various engineer command and staff positions prior to his assignment at West Point and is currently attending the Intermediate-Level Education (ILE) program at Fort Leavenworth, Kansas, during the 2007–2008 academic year. He can be contacted at <travis.lindberg@us.army.mil>.

Mr. Vargesko is the Training Division chief, Directorate of Environmental Integration, United States Army Engineer School, Fort Leonard Wood, Missouri. A retired engineer officer, he is the forum leader for the ArmyBaseCamp/JFOB.net professional forum on BCKS.

Endnotes

[1] S. L. A. Marshall, *Men Against Fire: The Problem of Battle Command in Future War*, Washington: Infantry Journal; New York: William Morrow, 1947.

[2] Ronald Maier, PhD, *Knowledge Management Systems: Information and Communication Technologies for Knowledge Management*, 2d Edition, Springer-Verlag, 2004.

[3] The tasks of design, construction, operation, maintenance, and retirement are referred to collectively in this article as the base camp life cycle.

[4] The term "base camp," although widely used, is not a doctrinal term. Some of the corresponding (and also frequently used) doctrinal terms for a base camp are forward operating base, forward operating site, intermediate staging base, and contingency operating base.

Photo by First Lieutenant Kenya Virginia Saenz

International Engineers Work Together in Afghanistan

By First Lieutenant Kenya Virginia Saenz

Afghans and multinational forces are working hand-in-hand on a variety of expansion construction projects for Forward Operating Base Sharana in Afghanistan. Soldiers from Task Force Pacemaker, Headquarters Support Company, are not only engaged in supporting the 864th Engineer Battalion (Combat) (Heavy) but also manage the missions of the multinational forces. Soldiers from the 864th; the 1st Construction Company, Korean Engineering Group; and the Polish 1st Engineer Brigade are teaming to construct metal building systems (K-Span buildings), roads, ditches, culverts, and sewage lagoons.

The Polish engineers provide additional leadership and manpower to multiple horizontal construction projects and are improving the roads by ensuring that proper drainage and sewage structures are constructed before the rainy season begins. Although they didn't know what to expect or what missions they would perform, their leaders stated that working with multinational forces has been a great experience. According to their commander, he learned different training techniques from the American Soldiers, compared them to their own techniques, then used the technique that worked best to accomplish the mission. The Polish army has been deployed in places such as Lebanon, Syria, and Africa to support many humanitarian missions since the War on Terror began in 2001.

The Korean engineers focus on K-Span construction. They are especially meticulous

Photo by First Lieutenant Kenya Virginia Saenz

A Polish engineer completes the final touches on a culvert as a scoop loader hauls away the rest of the dirt.

Photo by First Lieutenant Kenya Virginia Saenz

A Korean engineer welds a K-Span building that will support the expansion of the forward operating base.

Photo by First Lieutenant Kenya Virginia Saenz

Polish soldiers work on a culvert that will prevent flooding during the next rainy season.

and brought a vertical construction capability that the task force does not have. Once completed, the K-Span buildings will enhance maintenance operations and provide more space for supply support activity. Even though K-Span buildings are not common in Korea, the soldiers had been trained by civil engineers in their country. Their main goal was to bring proper engineering assets for future coalition forces. Even with the challenges of the language gap and different working systems, the construction progress and the relationship with multinational forces is going well.

The addition of Polish and Korean engineers, along with Afghan contractors, gave the task force a tremendous capability that it normally would not have—engineers of four nationalities working together toward a common goal. In addition, common understanding and respect for safe operations kept them accident-free despite the communication difficulties.

First Lieutenant Saenz is the public affairs officer for Task Force Pacemaker, 864th Engineer Battalion (Combat) (Heavy), from Fort Lewis, Washington.

Developing Adaptive Leaders for Full-Spectrum Operations:

The Engineer Captains Career Course

By Major John N. Carey

> *"The essential thing is action. Action has three stages: the decision borne of thought, the order or preparation for execution, and the execution itself. All three stages are governed by the will. The will is rooted in character, and for the man of action, character is of more critical importance than intellect. Intellect without will is worthless, will without intellect is dangerous."*[1]
>
> *—General Hans von Seeckt*

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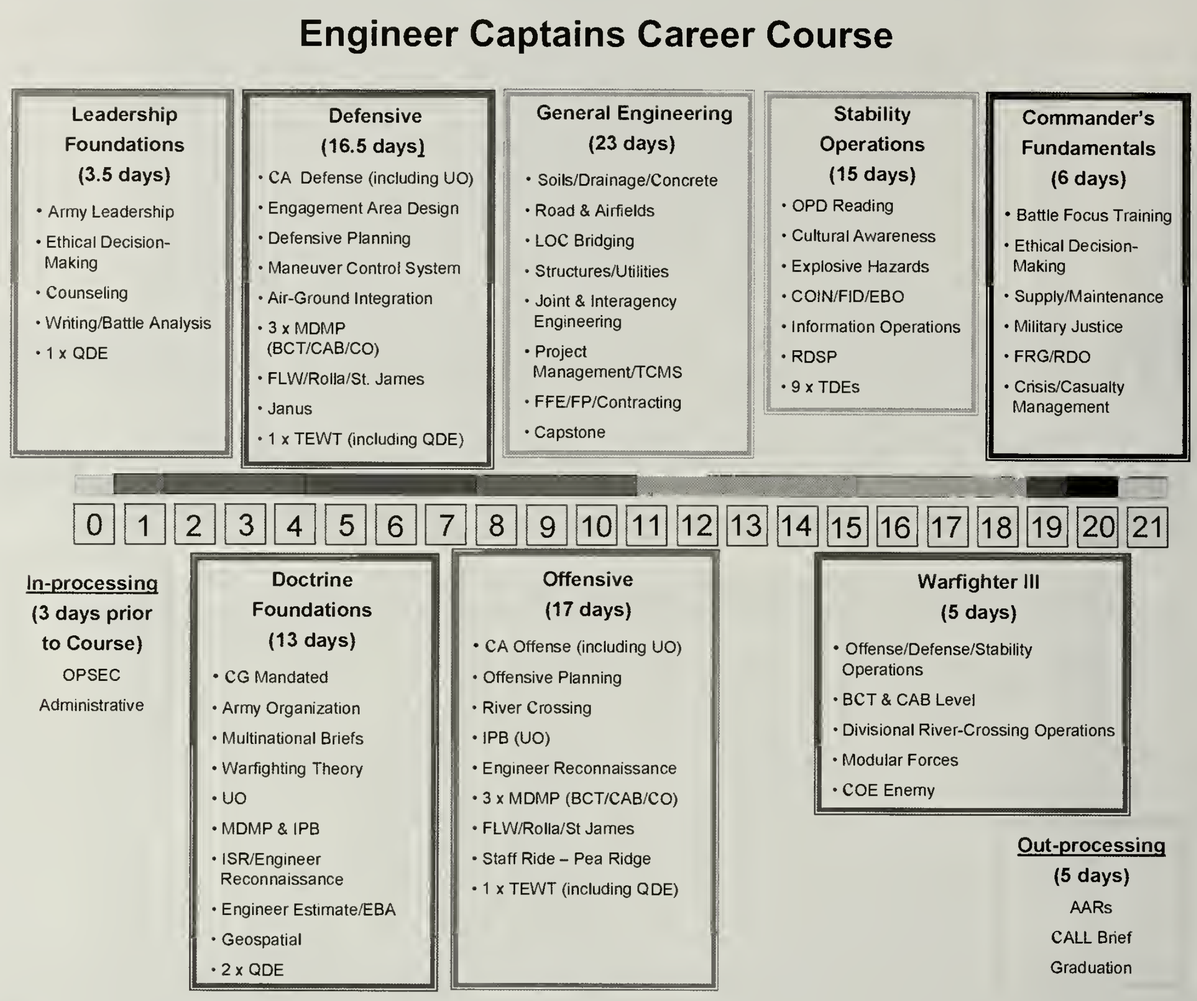
Success in full-spectrum operations requires several things: resourcefulness, knowing the enemy, determination, and leadership. From a training perspective, the challenge is to infuse these interdependent attributes into future commanders. How do we develop officers to be adaptable, creative, and intuitive? The Engineer Captains Career Course (ECCC) Division at the United States Army Engineer School, Fort Leonard Wood, Missouri, provides military education for full-spectrum operations (see figure, page 20). This article provides an overview of the current structure of the ECCC and how it develops captains for the contemporary operating environment (COE). We believe we are developing engineer commanders who are better prepared for the fight.

During the 21-week ECCC, the focus is always on quality and the individual. The teaching of doctrine emerges in an environment where "ideas are discovered and shared, not invented and arbitrarily imposed."[2] The course encourages systemic thinking, emphasizing the "whole" over the "parts." Students are taught how to think and are encouraged to experiment with doctrine, task organization, and decision-making strategies. The staff introduces warfighting theories using case studies from history and insists that students understand the maneuverist approach. Complex learning scenarios based on the modular force construct are volatile, indecisive, and ambiguous, ensuring that students attack the enemy's will to fight rather than just his physical ability to fight. Key objectives emphasized during the training include prompt analytical and intuitive decision-making, the ability to present clear verbal orders, the appropriate use of terrain, technical competence, independent initiative, and the ability to deal with uncertainty.

Changes in the course's subject material include greater emphasis on urban operations (UO), foreign internal defense (FID), counterinsurgency (COIN), information operations, and air-ground integration. The instruction was developed in coordination with the Maneuver Captains Career Course at Fort Benning, Georgia, to ensure that engineer officers can "talk the talk" in a combined arms (CA) environment. Students receive one day of media awareness training with professional civilian journalists and university interns. They continue to receive instruction on explosive hazards management from the Counter Explosive Hazards Center at Fort Leonard Wood. General engineering instruction remains at a technical level, but focuses on subjects relevant to engineer captains. Training includes base camp design; tele-engineering; project management; contracting; force protection (FP); infrastructure reconnaissance; field force engineering (FFE); and joint, coalition, and interagency operations. The use of war games and simulation has increased. Students fight a battle on the Janus combat simulation



Engineer Captains Career Course

Leadership Foundations (3.5 days)
- Army Leadership
- Ethical Decision-Making
- Counseling
- Writing/Battle Analysis
- 1 x QDE

Defensive (16.5 days)
- CA Defense (including UO)
- Engagement Area Design
- Defensive Planning
- Maneuver Control System
- Air-Ground Integration
- 3 x MDMP (BCT/CAB/CO)
- FLW/Rolla/St. James
- Janus
- 1 x TEWT (including QDE)

General Engineering (23 days)
- Soils/Drainage/Concrete
- Road & Airfields
- LOC Bridging
- Structures/Utilities
- Joint & Interagency Engineering
- Project Management/TCMS
- FFE/FP/Contracting
- Capstone

Stability Operations (15 days)
- OPD Reading
- Cultural Awareness
- Explosive Hazards
- COIN/FID/EBO
- Information Operations
- RDSP
- 9 x TDEs

Commander's Fundamentals (6 days)
- Battle Focus Training
- Ethical Decision-Making
- Supply/Maintenance
- Military Justice
- FRG/RDO
- Crisis/Casualty Management

In-processing (3 days prior to Course)
OPSEC
Administrative

Doctrine Foundations (13 days)
- CG Mandated
- Army Organization
- Multinational Briefs
- Warfighting Theory
- UO
- MDMP & IPB
- ISR/Engineer Reconnaissance
- Engineer Estimate/EBA
- Geospatial
- 2 x QDE

Offensive (17 days)
- CA Offense (including UO)
- Offensive Planning
- River Crossing
- IPB (UO)
- Engineer Reconnaissance
- 3 x MDMP (BCT/CAB/CO)
- FLW/Rolla/St James
- Staff Ride – Pea Ridge
- 1 x TEWT (including QDE)

Warfighter III (5 days)
- Offense/Defense/Stability Operations
- BCT & CAB Level
- Divisional River-Crossing Operations
- Modular Forces
- COE Enemy

Out-processing (5 days)
AARs
CALL Brief
Graduation

Legend:

BCT = brigade combat team
CAB = combned arms battalion
CG = commanding general
CALL = Center for Army Lessons Learned
CO = company
EBA = engineer battlefield assessment
EBO = effects-based operations
FLW = Fort Leonard Wood
FRG = family readiness group
IPB = intelligence preparation of the battlefield
ISR = intelligence, surveillance, and reconnaissance
LOC = line of communication
OPD = officer professional development
OPSEC = operational security
RDO = rear detail operations
TCMS = Theater Construction Management System
TDE = tactical decision-making exercise

program, receive focused feedback, and immediately fight the same battle again. Throughout this deliberate practice, students are actively coached by senior mentors.

The course promotes critical thinking by allowing students to examine different approaches and solutions to tactical problems without the fear of being criticized or ostracized. Throughout the training, they complete a professional reading program across the spectrum of operations. They brief peers and instructors on their findings and must be prepared to answer questions. Generic cultural awareness training and ethical decision-making includes historical case studies; quick-decision exercises (QDE); and visiting lecturers, including civilians and international officers. This is reinforced with daily briefings on current affairs and read-ahead discussions. Students also complete unscheduled quizzes, capstone events, and multifaceted final exams.

Students are encouraged to study military history to develop a greater understanding of the military art. Each module is introduced using historical examples, and instructors use vignettes to demonstrate the practical application of theories.

Students are required to research historical battles and develop a thesis. The best academic paper for each course will be submitted to the Engineer Professional Bulletin <*www.wood.army.mil/engrmag/default/htm*> for publication. The students attend a two-day staff ride to expand their technical knowledge and support professional and personal growth. They conduct site visits and terrain walks to develop their awareness. Lessons learned from combat are rapidly included in training to ensure the relevance and currency of the subject matter.

Training media to develop adaptive thinking are diverse and include model and map exercises, QDEs, and tactical-decision games. These test the students' decision-making abilities in a time- and information-constrained environment. Examples include search, raid, quick-reaction force, and route clearance missions. With training such as river-crossing operations, students experience the problem first and learn the theory afterward. This ensures that the students have some understanding of the operation to reflect on before they receive the formal instruction.

During the appreciation process, the officers use troop-leading procedures; mission, enemy, terrain, troops, time available, and civilian considerations (METT-TC); the military decision-making process (MDMP); and the rapid decision-making and synchronization process (RDSP). They are introduced to international methods such as "The Seven Questions," from the British Army, and the "Combat Military Appreciation Process," from the Australian Army. Students also conduct tactical exercises without troops (TEWTs), which involve examining a tactical problem, conducting an appreciation, and producing a solution for the ground where the problem is set. The practical application of the plan is emphasized. Assessment is based on whether the student made a timely decision in keeping with the commander's intent and the changing situation. Problems and terrain are selected to encourage discussion and highlight selected issues.

Professional mastery is built on constant training, peer and instructor feedback, and assessment. Everyone, including cadre, receives evaluations. Senior mentors support instructors by providing guidance and effective feedback that focus on adaptive thinking, innovation, and outcomes rather than on performance to standard. The small-group leader performs the role of instructor, coach, and mentor, determining when each role is required and should take primacy in the relationship with each student. Physical fitness is stressed and greatly improved. Students conduct combatives training and plan and execute physical training schedules for their team. Rigorous self-examination is encouraged through command philosophy development, effective counseling, after-action reviews (AARs), media awareness training, and vigorous and open debate.

Finally, the course leverages technology—particularly distributed learning techniques—using the Blackboard Learning System™. The Engineer Leader Smart Book and a community site for alumni have also been developed in coordination with training developers to ensure that course updates are available in the field. The cooperative degree program continues to be a significant aspect of the ECCC. This is an excellent opportunity for students to gain a master's degree with one of the universities that partners with the Engineer School. More importantly, the cooperative degree program fosters intellectual autonomy and confidence in reason.

"The ECCC is leading the rest in developing Army leaders for the 21st century. Recent graduates have informed instructors and training developers that they are better prepared for fighting full-spectrum operations."

The ECCC is leading the rest in developing Army leaders for the 21st century. Recent graduates have informed instructors and training developers that they are better prepared for fighting full-spectrum operations. They are able to look at a problem from various perspectives, assess the risks, and make timely decisions. The recent changes in the course address the gaps in mental agility and tactical and technical proficiency. The ECCC teaches students *how* to think, not *what* to think, and encourages future commanders to dedicate themselves to lifelong learning.

Major Carey, a member of the Australian Army, is the Division Chief, Engineer Captains Career Course, at the United States Army Engineer School, Fort Leonard Wood, Missouri. He has experience in providing engineer support to jungle, airmobile, and amphibious operations. He has commanded an engineer squadron in East Timor, taught tactics at the Royal School of Military Engineering in the United Kingdom, and served as an adviser on peace operations in Israel, Jordan, and Bougainville. He is a graduate of the Australian Defence Force Academy; the Royal Military College, Duntroon; and the Australian Command and Staff College.

Endnotes

[1] Hans Von Seeckt, *Thoughts of a Soldier*, E. Benn Ltd., Berlin, 1930.

[2] Major Don Vandergriff, "Raising the Bar – Creating Adaptive Leaders to Deal With the Changing Face of War" at <*http://www.d-n-i.net/vandergriff/rotc/rotc.htm*>.

Leadership: A Personal Viewpoint

By Lieutenant Colonel Wayne Larry Dandridge (Retired)

Leadership is taking the point position when your unit or flight is expecting contact with the enemy. Leadership is flying a crippled bomber to the ground when one of your wounded crewmembers cannot bail out. Leadership is keeping your young Soldiers, Marines, Airmen, Sailors, and Coast Guardsmen alive and never leaving your wounded behind. Leadership is writing a dead trooper's family a personal letter immediately after the battle.

Leadership is not glorifying war. Leadership is not doing "anything" just to get promoted. Leadership is not winning the battle at all costs, nor is it losing a war to avoid casualties. Leadership is not found in the security of a well-fortified command bunker, nor is it found in a plush officers' field mess.

No compromise of the integrity of one's word, deed, or signature is leadership. Setting high standards and seeing that they are met is leadership. Intelligence, dedication, creativity, and selflessness are leadership. Stamina, vigor, and commitment are leadership. Spontaneous, contagious enthusiasm is leadership. Initiative, self-improvement, and professionalism are leadership.

Leadership is rewarding a Soldier, Sailor, Airman, Marine, Coast Guardsman, or Civilian with the appropriate recognition immediately after exceptional service. Leadership is commanding and managing. Leadership is establishing and meeting, by priority, specific objectives. Leadership is managing by exception, using job enlargement, and seeking job enrichment.

Believing in God, family, and country—in that order—is leadership. Being humanistic is leadership. Trusting the ideas and decisions of well-trained troops is leadership. Knowing where the mission is, when the troops and material are to be there, and how many troops and systems are needed to win is leadership. Blocking out periods of "private time" to accomplish creative work and recharge is leadership.

Leadership is treating men and women equally without regard to race, color, creed, religion, age, or custom. Leadership is visiting your wounded and sick frequently. Leadership is knowing and living by the Constitution, the Code of Conduct, the Geneva Convention, and the basic human rights of all mankind. A leader is assertive, but not aggressive. Leadership is neither ruthless nor mindless discipline, but the ability to do the right thing at the right time, by putting the whole before the parts. Leadership is not a good efficiency report, nor is it paper readiness. Leadership is not a court martial for every mistake or leniency for serious violations. A leader is fair, predictable, and consistent.

Giving sound professional advice to a superior, even when you know he or she does not want to hear it, is leadership. After you have given your best advice, following all legal, moral, and ethical orders—even when you do not agree with them—is leadership. Leading when you can, following when you should, and getting out of the way when you have nothing to offer is leadership. Learning the language, culture, and customs of a host country is leadership. Staying in top physical condition is leadership.

Leadership is a general who knows the friendly and enemy situation, knows the immediate action sequence for the M16 rifle, knows his driver's first name and family, and can recite the Lord's Prayer. Leadership is a private who knows that he or she is in the chain of command and may have to take over when senior in rank. Leadership is knowing that a water truck in the desert is worth more combat power than an extra armored cavalry regiment.

Not forgetting that the past is our heritage, the present is our challenge, and the future is our responsibility is leadership. Not being overweight, not smoking, saying no to drugs, and not drinking alcohol in excess is leadership. Delegating authority, commanding confidence and respect, and accepting full responsibility for your actions is leadership. Ingenuity, sociability, tact, and tenacity are leadership. Cross training is leadership.

Leadership is not being right all the time, and it is certainly not being wrong most of the time. Leadership fixes problems—not blame. Leadership is adaptability, appearance, cooperation, and decisiveness. Leadership displays knowledge, manages resources efficiently, and plans beyond the immediate requirements of assigned duties. Leadership creates an organization of mutual respect. Leadership is building an organization and environment where it is not necessary to tell troops what to do. Leadership knows that combat without conscience is evil.

A leader knows why there are air, land, and sea forces; why there are cavalry, infantry, armor, artillery, aviation, amphibious, special operations, pre-positioned, recon, and logistical forces; and why combined arms and concentration of combat power are important. A leader knows about net-centric warfare and defense in depth, civil affairs, urban operations, the advantages our forces have at night, and how to use them. A wise leader knows that young Soldiers spend most of their time worrying about and planning tactics, while older more experienced Soldiers spend the majority of their time worrying about planning logistics.

Photo courtesy of U.S. Army

"Leaders know about the need to wage 'total war' to win and the special advantage the defender has in cities, mountains, and jungles." (Combat engineers with Special Troops Battalion, 2d Brigade Combat Team, 82d Airborne Division, prepare to enter and clear an "enemy" compound during an exercise.)

Leadership can be good or bad, centralized or decentralized, warm or cold, offensive or defensive, macro or micro, expensive or free. Leadership can be Catholic or Protestant, Jewish or Moslem, Hindu or Mormon, Atheist or Agnostic. Leadership prevents overmobility of junior leaders and troops, by keeping them in their jobs long enough to really learn their jobs and common and collective tasks and to work as team members. Establishing and promoting worker and troop certification and team certification programs are leadership.

Leaders hope and pray for the best and plan for the worst. Leaders know about the need to wage "total war" to win and the special advantage the defender has in cities, mountains, and jungles. Leaders know how to "own the night" and take maximum advantage of all of the combat arms team and are skilled in the use of snipers, attack helicopters, counter artillery, naval gun/missile fire, and close air support. Leaders know not to keep troop weapons locked up and away from them, but rather train troops to live with a clean weapon that they are an expert with.

Leadership is embodied in Martin Luther King Jr., Abraham Lincoln, Pope John Paul II, Robert E. Lee, Mohammed, Irwin Rommel, Jesus, Joan of Arc, John Paul Jones, Winston Churchill, Sister Teresa, Margaret Thatcher, and many other well-known figures. Leaders are also Robert Lightle, J.C. Dandridge, Sam Deloach, Bubba Segrest, Lee Thompson, Val Berger, Earl Erickson, Luther Bergen, Judi Dandridge, Rick Maull, and thousands of other unknowns.

Commitment to the team and a participatory form of leadership that draws on every troop's knowledge and skills—at every level—is leadership. Encouraging and rewarding suggestions and complaints is leadership. Having an "open door" and "open mind" policy is leadership. Empowering troops, civil service employees, and support contractors with the tools, responsibility, authority, and "accountability" to get the tough jobs done is leadership. Making troops multiprocess, multiweapon, and multifunctional experts is good leadership. Good leaders practice servant leadership.

Leaders know that "the bitterness of low quality remains long after the sweetness of low price." Leaders allow talented soldiers "long tethers" for experimenting. Leaders find ways to satisfy the essential dualism of troops and civil servants to be both part of a team and be recognized as individuals. Leaders know how to use "internal and external benchmarking," observations, and inspections to rate their organization's readiness, products, services, and processes against those front-runners in their specialty.

Leadership is guiding. Leadership is legendary. Leadership is foresight. Leadership is absorbent, abstinent and, unfortunately, at times it is abominable. Leadership is baccalaureate, balance, basic, and too frequently backward and barbaric. Leadership has saved lives, killed, stopped wars, and started wars. Leadership has walked softly and carried a big stick, but it has also been loud and nonviolent.

Saying what you do (in clear, concise standard operating procedures, plans, and operations orders) and doing what you say is leadership. Breaking down communication barriers between staffs, line units, support organizations, and sister units is leadership. Asking deep probing questions and finding root causes is leadership. Changing problems into opportunities is leadership. Knowing that you can seldom wait until you have all of the answers is leadership. Repeatedly doing simple things that demonstrate sincerity is leadership.

Leadership is honesty, enthusiasm, loyalty, courage, and wisdom. Taking care of your Soldier's, Civilians, Sailors, Airmen, Coast Guardsmen, and Marines and their dependents is leadership. Leadership includes being a good boss, comrade and friend, father or mother, son or daughter, sister or brother, and husband or wife. Knowing that the profession of arms is much more than just a job is leadership.

Being an unquestionable friend to the environment is leadership. Basing decisions on facts is leadership. Promoting and rewarding continuous improvement is leadership. Being a champion of safety and quality is leadership. Staying focused on internal customers, external customers, and the enemy is leadership. Performing preventive maintenance, knowing what cellular techniques involve, being skilled in setup reduction, understanding mixed-model methods, understanding rocks-in-the river inventory management, knowing how to level and balance workload, understanding that distance (to supplies, replacements, ammunition, fuel, etc.) is usually evil, and ensuring that things are at least "in time," not "just in time."

Leadership is enthusiasm, optimism, helping, training, encouraging, understanding, motivating, disciplining, crying, laughing, standing firm, giving way, counseling, correcting, giving a second chance, and trying again and again. Leaders are tall, short, thin, heavy, male, female, black, brown, white, yellow, old, young, and naturalized and unnaturalized. Leaders are from the city and from the farm. Leadership works hard to close the gap between the potential and the performance of a Soldier.

Knowing how to use teams, flow charts, simple—yet powerful—statistical methods, simplification, continuous improvement, complaint and suggestion programs, and standardization to get the tough jobs done is leadership. Leadership makes quality easy to see, feel, smell, taste, and hear, by finding root causes and permanently fixing the problem. Leadership is clarifying processes, flow-charting complex processes, and making every troop an expert at Soldier common tasks—everyone should be an infantryman first!

Leadership is caring, compassion, understanding, and leading by example. Leaders look you in the eye, kick you in the butt, cover your flank, and take your place on the most dangerous mission. Knowing there is "a place for everything and everything in its place" is leadership. Leadership is admitting mistakes and learning from them. Eating last is leadership. Practicing servant leadership and sharing the pains of heat, dirt, sand, cold, wet, insects, and other harsh environmental conditions is leadership. "Packing your own roll and digging your own hole" is leadership.

Leadership comes from experience, but experience comes from making mistakes. A leader changes the odds and knows the risks. Leaders develop teamwork. The tides, the channels, the seasons, the winds, the hazards, the weather, and the best forecasts are all known by leaders. Leadership knows that the one most important word is "we" and the least most important word is "I." Leadership knows there is no end to change, except failure. Leadership knows that if you treat every customer like your last or first, you will never have to worry about repeat business.

Leaders often make good grades in school and have many years of formal education and numerous important degrees. But they also have been known to fail math, English, and other equally important subjects. Leaders make sure the enemy gives his life for his cause. Leaders ensure that their troops always have the tactical advantage, the best training and equipment, and the highest morale, as well as plenty of water and hot food. Leaders work hard at ensuring that the workload is distributed equally among all troops.

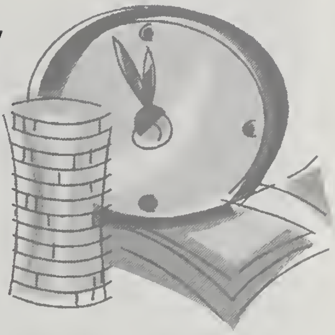
Leadership comes from family, friends, teachers, coaches, and pastors. Simple, easy-to-understand orders come from leaders. Complex tasks are changed into short and accurate plans through leadership. Leadership can be learned and taught, but it cannot be forgotten nor bought. Leadership can be seen, tasted, smelled, felt, and heard, and it can come from a blind person with no hands who cannot hear, speak, or walk.

Finally, a leader is so in love with life that he or she is willing to die to ensure that others' lives—and our great nation—will go on!

Lieutenant Colonel Dandridge (Retired) is a certified Business Process Reengineering Specialist as well as the East Region Manager and a Senior Engineer with WESTAR Aerospace and Defense Group, Incorporated, Field Services Division, and the CEO of CLC Hospice, LLC. He is an Army ex-enlisted infantryman; ex-aviation warrant officer; combat attack, utility, and scout helicopter pilot; fixed-wing pilot; flight examiner; instructor pilot; and a retired Army Master Aviator. An FAA-certified flight instructor in airplanes, helicopters, instruments, and basic ground, he has worked as a multi- and single-engine commercial pilot. A graduate of the Armed Forces Staff College, he holds a bachelor's in aeronautical science and a master's in transportation management. Lieutenant Colonel Dandridge, a member of the West Point Logistics Hall of Fame, has had professional articles published in more than 16 U.S., German, and British professional journals, magazines, and newspapers.

Note: Beginning with this issue, *Engineer* will include an article from a previous issue of the bulletin, which has published continuously since the premiere issue in Spring 1971. When Lieutenant Colonel Dandridge recently submitted this article—an update of one that was selected as the first of a new feature called *A Personal Viewpoint* in the Winter 1983-84 issue—it seemed like an appropriate first article for our new feature called *From the Archives*.

SAVING THE ARMY TIME AND MONEY



By Lieutenant Colonel Bradley A. Duffey

In a growing military community like Grafenwoehr, Germany, balancing housing and community needs with training requirements is complex. Sometimes, ensuring that both areas of need are covered requires some out-of-the-box thinking.

Back in March 2007, the 7th United States Army Joint Multinational Training Command (JMTC) Safety Office had no choice but to shut down a critical ammunition holding area because it was too close to new housing construction. Without the use of that holding area, units training at Grafenwoehr would feel the impact immediately. Faced with an already demanding and rapidly increasing operations tempo, JMTC began sorting options to resolve the issue. There were three possible avenues to be evaluated:

- The first option—contract development of a new ammunition holding area—was quickly ruled out. The contracting process would be too time-consuming and would directly impact operations on the ranges and training sites. A faster solution was needed.
- The second option was to negotiate with the German government, which was willing to allow continued use of the holding area, but at greatly reduced tonnage. That would also impact operations and slow down training for the units as they took valuable time to readjust ammunition receiving and distribution plans instead of putting rounds downrange.
- The third option, which JMTC chose, was to request that Army National Guard engineer assets come to Grafenwoehr for overseas duty training, with a goal of having the new site built within 21 days. With that plan in hand, the command invited the 631st Engineer Company from Lawrenceville, Illinois, to train at Grafenwoehr. This mission closely resembles combat operations in Iraq or Afghanistan, since units in both places are working similar issues regarding ammunition holding area construction. As the theater matures and neighborhoods in such places as Balad and Baghdad improve, ammunition holding areas will ultimately have to be moved and rebuilt.

JMTC still faced another problem—money. Fiscal year 2007 funds were earmarked, and even though bringing in National Guard Soldiers for construction saved the Army nearly $185,000, still more dollars needed to be saved. Time and dollars were both tight, and it would take lots of both to bring the unit to Germany, conduct a reconnaissance, obtain data, return home, and then prepare to deploy to Germany for

Soldiers from the 631st Engineer Company build concrete walls for the ammunition holding area.

The Soldiers begin site preparation and conduct new operator training.

the mission. To offset some of these costs, the United States Army Corps of Engineers® (USACE), Europe District, was called for design assistance. The chief of operations, plans, and security for the district sent a forward engineer support team-advanced (FEST-A) to Grafenwoehr to conduct the site plan survey.

This mission was a great training opportunity and the type of mission the FEST-A was designed to accomplish. The team, combined with reachback support, provided a great resource. The team conducted an area assessment, compiling data and sending it to the USACE TeleEngineering Operations Center in Vicksburg, Mississippi. The center analyzed the data and forwarded the mission to the USACE Ordnance and Explosives Center of Expertise in Huntsville, Alabama. There, using the data from Grafenwoehr and analysis from Vicksburg, experts in the explosives storage field were able to create a design, develop a scope of work, and determine the bill of materials needed. JMTC used the design to coordinate with the 631st and determine the number of personnel and amount of equipment needed for the project. The design created was used as the centerpiece of the master plan to execute the mission.

Faced with a limited budget, JMTC had to phase in the project over two years. The minimum standards for an operational ammunition holding area were gravel pads, protective berms, and lightning protection poles. The engineers had to be creative with the design of the berms in order to save money on fill material. There were three variations of the berm, but the design agreed on by agencies within JMTC was the one that saved the most amount of fill, thus saving more money.

Because of other construction projects in the JMTC area of responsibility, equipment was limited. The 631st had the following assets for the construction project:

- (1) Roller
- (2) 2½-yard scoop loaders
- (1) 917 dump truck
- (1) 5-ton dump truck
- (2) D7 dozers
- (1) Grader
- (1) Small Emplacement Excavator (SEE)

The purpose of the overseas deployment training was not only to augment the Active Army in mission accomplishment but also to allow the unit to think outside the box and work around its own strengths and weaknesses to complete the mission. Unit leaders received a cookie-cutter Program Evaluation Review Technique (PERT) chart as guidance; however, the unit had to shape the project chart for rain delays and equipment deadlines. For instance, the 631st spent an entire day analyzing the terrain for grading activities because increased grading and dozer activities would eventually change the direction and flow of rainwater on the site. As a result, an extra day was planned to improve drainage. Also, the unit leadership decided to sequence construction activities so fill material was not exposed to excessive rainwater for long periods of time.

The 631st encountered several other minor problems that caused it to think outside the box to find a feasible solution to

Army National Guard Soldiers from the 631st Engineer Company install a lightning protection pole next to a pad for the ammunition holding area.

meet the standards of the mission. For instance, the unit had a D7 dozer that was not running at full capacity. To prevent pushing it to its limits and hastening a deadline status, the dozer was used in its limited capacity as a D5. This limited the D7's production, but having the extra lag time was worth more than losing the dozer to maintenance downtime. The company constrained the project by choosing the activities that had the most total float, such as berm construction.

The 631st also had to conduct a concrete mission for this project. The unit received support from three members of the 368th Engineer Battalion (Combat) (Heavy) from Londonderry, New Hampshire, who provided oversight for the form construction and concrete installation. After the concrete was poured on the first pad site, members of the 631st completed the rest of the concrete work needed for the pads. An added feature to the concrete edging was metal bands installed inside the formwork to connect to the lightning protection poles.

New lightning protection poles were not going to arrive until long after the 631st had returned home. Faced with not being able to use the ammunition holding area until late August, the decision was made to salvage the poles from the old site and develop a workable plan. However, the lightning protection poles ordered to specification were taller and had two loops at 90-degree angles for feeding wire cable through to connect the poles. The 631st adapted the plan by turning the existing poles so that the single loop faced into the pad at a 45-degree angle, allowing the cables running around the top to be connected to each pole by one loop instead of two.

After the 631st installed lightning protection poles and grounding wires to the first pad with the concrete edging, the Grafenwoehr Department of Public Works came to the site and conducted an ohm test. The test results were well within the acceptable range. It is necessary for the pad to have less than 10 ohms, since more than that would require additional grounding rods placed below the pad.

As time constraints became a larger issue and materials in the original design were not going to be available for the unit to complete the project as originally designed, the 631st broke the plans down into mission-essential elements and nonessential elements. If the unit found that a nonessential element was going to delay the completion of the project, the Soldiers developed alternate courses of action that achieved the same end state. The ingenuity of the Soldiers from the 631st Engineer Company kept the project under budget and on time. And of equal importance, maneuver training went ahead seamlessly, without interruption.

Lieutenant Colonel Duffey is the Reserve Component Liaison Officer and Troop Construction Officer in Charge for the 7th United States Army Joint Multinational Training Command, Grafenwoehr, Germany. His past assignments include Operations Officer, Facility Engineer, for Headquarters, 416th Engineer Command, and Operations Officer, Battle Projection Group, for the 1st Simulation Exercise Group, 75th Division. He holds a bachelor's from the University of Central Oklahoma in Edmond, Oklahoma, and a master's from Central Michigan University in Mount Pleasant, Michigan.

Engineer Dog Handler Honored

By Captain Erik Karstensen and Mr. Luke Waack

On 4 December 2007, the Army's newest and most modern veterinary hospital and military working dog kennel, located at Fort Leonard Wood, Missouri, was dedicated to a fallen Soldier, Corporal (CPL) Kory D. Wiens. A member of the 94th Engineer Detachment (Canine), 5th Engineer Battalion, 1st Engineer Brigade, Fort Leonard Wood, CPL Wiens and his specialized search dog, Cooper, were killed in July by an improvised explosive device (IED) while on patrol near Baghdad. They had been in Iraq since January.

CPL Kory D. Wiens and his specialized search dog, Cooper

Dozens of family members, friends, and Soldiers attended the dedication ceremony, and the memory of CPL Wiens was honored with words, song, and actions. Brigadier General (BG) Gregg F. Martin, United States Army Engineer School commandant, addressed the Wiens family directly, saying, "We will never forget your son. We will always remember him as the great Soldier and the great person that he was."

Murray Weinstock, a singer-songwriter who has worked with many well-known recording artists, performed his song "War Dogs," which he wrote after seeing a documentary that highlighted the special relationship that exists between these beloved canines and their military handlers. To quote the song, "A bond is built forever, forever and a day; built on love, built on trust, that's the K-9 way."

An oil painting depicting CPL Wiens and Cooper was dedicated to the facility by military artist Chief Warrant Officer 2 (CW2) William Smock, who also presented a watercolor version of the portrait to the Wiens family. An Indiana National Guardsman, CW2 Smock has painted many scenes from his deployment to Iraq. And in May 2007, he presented a portrait of engineer Medal of Honor winner Sergeant First Class Paul R. Smith when Fort Leonard Wood's new Counter Explosive Hazards Center (CEHC) was dedicated to the fallen hero (see *Engineer*, April-June 2007, page 24).

KORY D. WIENS
VETERINARY HOSPITAL AND DOG KENN

Engineer Soldiers stand at parade rest during the dedication of the Kory D. Wiens Veterinary Hospital and Dog Kennel.

The new kennel training facility—a part of the CEHC—will be home to the Engineer Regiment's Forces Command (FORSCOM) Canine Company. This company, which has grown since its inception in 2003, has become the most constantly deployed unit in the Regiment, with canine elements deployed continuously to Operation Enduring Freedom since 2003 and Operation Iraqi Freedom since 2004. The Soldiers and canines involved in these deployments provided the Army mine detection and specialized search capabilities that have saved the lives of countless coalition forces. These symbiotic teams of Soldiers and canines develop phenomenal capabilities to detect weapons, ammunition, and explosives and are an essential element to fighting the War on Terror.

The Kory D. Wiens Veterinary Hospital and Dog Kennel will provide state-of-the-art facilities to support the training of current and future engineer dog teams. The facility provides 36 new kennel runs for these vital assets. This increased capacity, which makes it the largest FORSCOM kennel and second largest kennel in the Department of Defense, allows the teams to better support both the War on Terror and missions closer to home. (The largest kennel is the Department of Defense Military Working Dog Center at Lackland Air Force Base, Texas.)

The kennel runs are almost as large as a single Soldier's room, providing the working dogs plenty of room to move about. Additionally, the offices in the kennel provide a state-of-the-art working environment, which significantly enhances the Canine Company's operations. The facility helps create a colocated synergy between handlers, kennel masters, and the chain of command.

And lastly, the colocation of the veterinary hospital with the kennel is a tremendous benefit to the military working dog (MWD) program. This regional hospital is not only responsible for the health of engineer MWDs but also for MWDs of military police and other branches of service as well, to include those on surrounding forts and bases.

Photo by Mike Curtis, DOIM, Visual Information Center

This oil painting depicting CPL Kory D. Wiens and Cooper was dedicated to the facility by military artist CW2 William Smock.

During the ceremony, BG Gregg Martin presents Mr. Wiens with a remembrance plaque of his son, CPL Kory D. Wiens.

The hospital—which will provide both routine and emergency care—has an intensive care unit, a full laboratory, and modern X-ray equipment, along with a fully enhanced surgery suite. It will ensure that the MWDs receive the best care available to keep them at their fighting best. With the veterinarian hospital being colocated with the kennel, engineers can cross-train with the Veterinary Corps to learn valuable medical skills to better care for the working dogs while deployed on missions. It will also enable military occupational specialty (MOS) 68T animal care specialists to further enhance their skills and proficiency in the hospital environment, as well as the combat environment.

CPL Wiens, who was dedicated to the MWD program, was named Kory after his grandfather, a canine handler in the Korean War. CPL Wiens and Cooper, a Labrador retriever, were the first MWD team killed in action together since the beginning of the wars in Iraq and Afghanistan. They were buried together in CPL Wiens' hometown in Oregon.

Captain Karstensen is the commander of the FORSCOM Engineer Canine Company.

Mr. Waack, a writer for the Fort Leonard Wood newspaper, the Guidon, since October 2007, was a Soldier and broadcast journalist from 2001-2006. His last duty assignment was at the American Forces Network in Vicenza, Italy.

Photos by Luke Waack, unless otherwise indicated.

Katrina Lessons Leave LSU Safer

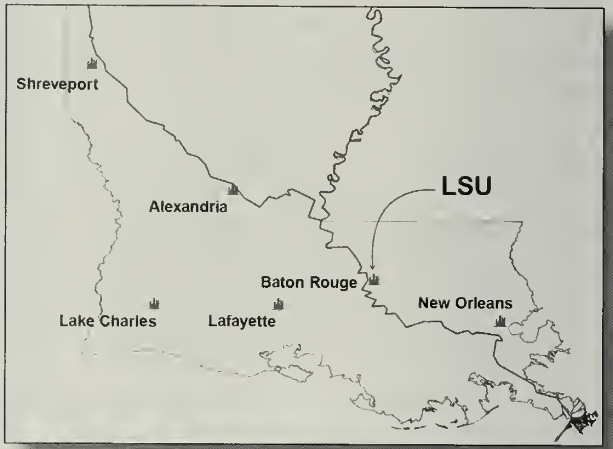
By Dr. JoAnne Castagna

As students begin a new semester at Louisiana State University (LSU) at Baton Rouge, the school—with the help of the United States Army Corps of Engineers® (USACE)—takes a new approach to keep its college community safe from future hurricanes. The region recently marked the second anniversary of Hurricane Katrina, the sixth-strongest Atlantic hurricane ever recorded and the third-strongest hurricane on record to make landfall in the United States. USACE continues to deploy thousands of personnel to the Gulf Coast to assist the Federal Emergency Management Agency (FEMA) and other federal, state, and volunteer organizations in getting the beaten region back on its feet. One of the ways USACE is helping is through Geographic Information System (GIS) support.

A GIS expert with the New York District of USACE is one of four national action officers responsible for deploying and managing GIS teams throughout the Gulf region. He explained that GIS is a computer-based information system and tool for analysis of spatial data. It takes data from various sources—such as aerial photographs, drawings, and electronic geographic data—and combines these layers of information as overlays to perform spatial analysis and produce an electronic map that depicts the results of that analysis.

Photo by Brad Mooney, FEMA

A USACE/LSU team maps out the university campus using GIS technology.



Map by Roger W. Porzig, Jacksonville District, USACE

Louisiana State University at Baton Rouge

USACE is using the GIS to help make LSU a disaster-resistant school. Even though the school wasn't damaged by Katrina, the campus is still vulnerable to future hurricanes since it is located in the southern part of Baton Rouge, bordered on the west by the Mississippi River. Louisiana is a coastal state that faces threats from hurricanes and tropical storms year-round, but especially during hurricane season. Katrina was a Category 5 storm that left death and destruction along its path. Since last year, USACE has been working with the university to map the entire school into the GIS. If a hurricane occurs, the school administration will have maps electronically available to help guide them through the situation and save lives of thousands of students and staff.

The main function of the GIS-based maps is to reduce the time it takes for emergency personnel to assess a given situation. LSU wanted to get its entire 2,000-acre campus into the GIS, including all of its buildings, parking lots, sidewalks, and roads. Building information was linked to the school's safety database, including building names, number of rooms, classroom numbers and layouts, square footage, and professors' names and telephone numbers. If an emergency occurs in a particular building, school staff members can pull up the GIS map, click on the building to see where emergency exits and fire

Photo by Jim Zietz, LSU Public Affairs

The Pete Maravich Assembly Center, a large indoor basketball arena, was used as a medical special needs shelter in the aftermath of Hurricane Katrina.

extinguishers are located, and access contact information for professors or other personnel who are normally in that area of the campus. If a certain portion of a building is damaged, the GIS information can provide an idea of who may be trapped or in danger.

A spokesman for the university police said that the GIS will make LSU an "active campus" that will give important data about facilities. For example, if there is a fire in a laboratory, officials can click on that room, see what chemicals are stored there, and pass the information to the fire department. The Pete Maravich Assembly Center, a large indoor basketball arena, served as a medical shelter for New Orleans residents with medical special needs in the aftermath of Katrina. Now the school wants to better prepare it to serve as a medical special needs center in case another hurricane hits. Digitized drawings of the arena created electronic maps in the GIS, and the school's hospital and social services departments determined where beds, medicine, and volunteers should be placed. If the shelter is activated, employees working there will know where and how to set up the beds, where to store the medicine, and where tables are set up, so the operation will proceed smoothly. Officials will be able to assess an emergency situation more quickly with the GIS electronic-based maps than with printed maps that may be obsolete since roads, parking lots, and buildings may change over time. GIS maps can be updated with new information immediately, as opposed to printed maps that may only be updated every couple of years.

The GIS system will also serve as a basis for a 9-1-1 emergency telephone number system for the LSU campus, which is a city within a city. The GIS will also be useful in situations in which many different agencies converge on a scene. The personnel from the agencies may not know the area, so GIS maps will help them become familiar with the layout of the buildings and the campus. Before USACE developed the GIS maps for the school, campus addresses were not available and useful street data had not yet been developed. Simple package deliveries to the campus were major obstacles for the staff and faculty.

The USACE GIS team will continue to support FEMA and LSU in Baton Rouge as long as necessary.

Dr. Castagna is a technical writer-editor for the United States Army Corps of Engineers New York District. She can be reached at <joanne.castagna@usace.army.mil>.

Photo by Jim Zietz, LSU Public Affairs

The Memorial Tower is a central feature of the Louisiana State University campus.

FUELING THE FRONT LINES:

ARMY PIPELINE UNITS - PART I

By Mr. Thomas J. Petty

The United States Army's pipeline companies were developed to meet the Army's increasing reliance on the mechanized forces, which ran on gasoline, diesel, and aviation fuels. The truck, the tank, and the airplane all needed fuel to operate. Modern warfare saw the ever-increasing need to put these fuels into the theater of war in larger and larger quantities, over a more complex area. From the 5-gallon jerry can to a tank farm holding hundreds of thousands of gallons, uncontaminated fuels had to be delivered reliably and promptly in the quantities necessary to sustain the units they supplied. The pipeline companies were often up front with the invasion landing parties, to find and salvage any facility that could be used for fuel storage and distribution. Gasoline and fuel oil accounted for more than half of all the tonnage shipped overseas during World War II.[1]

World War I had seen limited need for pipeline systems. Distribution by tanker trucks and railcars and the jerry can was sufficient. After the war, the civilian petroleum industry expanded rapidly, and by the beginning of World War II a lightweight, easy-to-assemble pipeline and storage system had been designed. The system used lengths of rigid steel pipe with grooves at each end, joined by what were commonly called "Victaulic" couplings, named after the Victaulic Company of America, one of the coupling's manufacturers. Inside these couplings were rubber gaskets that sealed the joints. When hydraulic pressure was applied, it sealed the gaskets almost as securely as welding.

Photo courtesy U.S. Army Engineer School

The Rhône River pipeline stretched 487 miles between Marseilles and Sarrebourg, France. The line consisted of two 6-inch pipes and one 4-inch pipe. September 1945

In 1939, the Shell Oil Company offered the Quartermaster Corps (as the branch responsible for the purchase and distribution of petroleum products) an imaginative study that "contained all of the major elements of the military pipeline systems that were to be used during World War II, including lines from ship to shore, bulk storage tanks beyond the water line, and a pipeline with pumping units leading right up to the front line."[2]

The Quartermaster Corps, which was interested in using a pipeline as a way to unload fuel from ships and take it a short distance to the nearest storage facility, got approval to build a 5-mile test section of pipeline in Hydro, North Carolina, in February 1941. Results of the test—which constructed pipeline from a valley, across a river, and up a hill to a distribution point—were good. Further tests and trials soon came to the attention of the Army engineers, who wanted to string pipe from the ports to the front lines, even if the front lines were hundreds of miles away.

It was not only the Army engineers who saw the potential of this system. By the fall of 1941, the Chinese government wanted to obtain the system through the Lend-Lease Program for use along the Burma Road. A pipeline was of great interest to the Chinese since "trucks delivering gasoline over the Burma Road consumed half of their load in making the trip."[3] This pressure from the Chinese helped spur greater movement in the development of a usable and workable system. The Army engineers were asked to study this project. Brigadier

Photo courtesy U.S. Army Engineer School

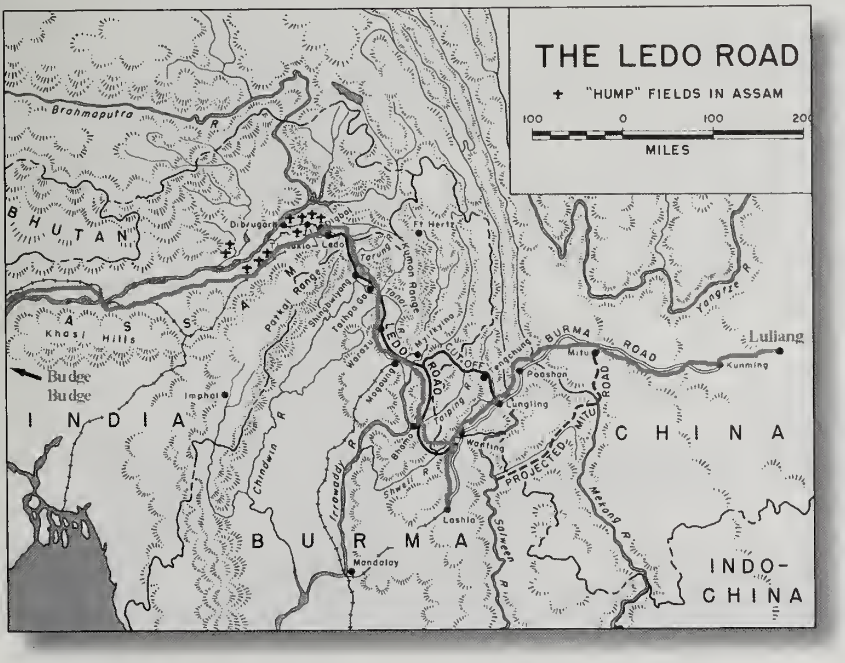
These 6-inch pipelines transported fuel from ports to the front line.

General John Magruder, Chief of the Military Mission to China, determined that the project would—

- Cost $5,000,000.
- Require 16,000 tons of steel.
- Include 240 possibilities of control failure and 200,000 possible points of leakage.
- Require 40 pump stations.
- Be constructed over very rugged terrain.

Brigadier General Magruder believed that the system had sufficient merit to warrant further study, but was not yet sufficiently proven to be installed.

Sid S. Smith, the Shell Oil Company representative who had designed the pipeline system, proposed laying a 30-mile line of 4-inch pipe, complete with pumps and automatic controls, as a further test of the system. This was a turning point for the military application of pipeline. A test site in the mountains of the Shenandoah National Park in Virginia was selected. Soldiers were not readily available for the project,



United States Army engineers and the Chinese army laid 2,000 miles of pipeline from Budge-Budge, India, to Luliang, China, in 15 months.

A Soldier from the 2656th Petroleum Distribution Company experiments with alternative transportation methods in Tunisia in 1943.

so workers were hired from the local civilian population. The project started on 30 June 1942 and concluded in mid-October. During this time, a lot of information was collected and problems resolved. On 8 July 1942, an unskilled crew laid 16.5 miles of pipe complete with pump stations in 18 days. Problems with the couplings were found and resolved. The reciprocating pumps seemed to wear out quickly, so centrifugal pumps were recommended as a solution.

At the same time, the Army engineers and the Quartermaster Corps resolved questions of control. It was decided that engineers would lay the pipeline from the ships to a point as far inland as needed and build the storage facilities and pump stations. The Quartermaster Corps would be responsible for the distribution points along the pipeline. Because the Virginia experiment was such a success, the Chinese were able to lay their pipeline along the Burma Road (and its successor, the Ledo Road). The Army engineers and the Chinese army eventually laid 2,000 miles of pipeline from Budge-Budge to Luliang in 15 months. (See map on page 33.)

With the success of the Virginia experiment in mind, the Office of the Chief of Engineers ordered a short training program to begin. On 15 October 1942, two pipeline detachments were organized and began training at Fort Belvoir, Virginia. A month later, the program was moved to the Desert Training Center in the Mojave Desert so that the equipment would not need to be winterized. The program was also expanded to four pipeline detachments at this time. These first units, which were manned by Soldiers with previous oil field experience, performed extremely well overseas. By later forming the nucleus of new units, these Soldiers helped expand the program in-theater.

The first petroleum distribution company was the 696th. Manned entirely by experienced oil field personnel,

A Soldier welds sections of 8-inch pipe that will bring fuel to Allied aircraft, armor, and motor transport in France. September 1944

Photo courtesy U.S. Army Engineer School

Photo courtesy U.S. Army Engineer School

American engineers work on a stone bridge to add support for sections of a petroleum pipeline. France 1944

both officers and enlisted, it bypassed the pipeline training school. In November 1942, it was already stationed in North Africa. By the end of the war, this company released personnel from its ranks to form the nucleus of three more pipeline companies. The first of these companies was the 697th Petroleum Distribution Company.

The first two detachments finished their training and left the Desert Training Center in January 1943. By March, there was dissatisfaction with the detachment system, which tied pipeline units to regiments. An independent pipeline company could do the same job with 20 percent fewer personnel. It was decided in May 1943 that an independent pipeline company should consist of 7 officers and 221 enlisted Soldiers, with headquarters and operating platoons. The training program was greatly accelerated and, in May 1943, an additional four companies started training, which put a strain on the training facility and staff. The facility was expanded, some parts of the training were cut short, and others were extended. In spite of the training shortcomings, pipeline units in Europe were laying 35 miles of pipeline per week, much faster than the 16 miles in 18 days that was first achieved. No theater had enough pipeline troops for optimum operations, and other engineer units were forced to take on pipeline duties. By the end of the war, there were 59 pipeline companies totaling 12,323 Soldiers.[4]

Some companies were formed in-theater by taking a few experienced officers and noncommissioned officers (NCOs) from other pipeline units and augmenting them with inexperienced enlisted men. One such company was the 2656th Petroleum Distribution Company (later designated the 697th), which was formed in North Africa in 1943.[5]

Around June 1943, one officer and nineteen enlisted Soldiers from the 2602d Engineer Pipeline Company (formerly the 696th), headquartered in Bizerte, Tunisia, formed the nucleus of the 2656th Engineer Pipeline Company. This company was then filled with Soldiers and officers from other units in North Africa. After working on projects in North Africa for two months, the 2656th landed at Palermo, Sicily, in August 1943. It was then renamed the 697th Petroleum Distribution Company. After completing a few simple tasks, the company packed up and relocated to Taranto, Italy, on 13 October 1943. The unit's Soldiers set up their base camp at Foggia, where the unit remained during its stay in Italy. From this base camp, the 697th sent out detachments to construct and operate various pipelines and storage tanks in Italy.

"The pipeline companies were often up front with the invasion landing parties. . . Gasoline and fuel oil accounted for more than half of all the tonnage shipped overseas during World War II."

The first assignment for the 697th was to construct a ship-unloading facility at Manfredonia and lay a 24-mile pipeline from there to Foggia. After just 28 days, the first fuel arrived at Foggia. Three 10,000-barrel tanks, one 5,000-barrel tank, the unloading facility, and 24 miles of pipeline had been completed. On 13 November, the first fuel was discharged from the gasoline tanker *Aroostock* and by 25 November, 160,000 gallons of 100-octane aviation fuel a week was flowing into Foggia, which was destined to be the hub of southern Italian fuel distribution. The 701st and the 696th Petroleum Distribution Companies (which were destined to work side by side with the 697th throughout the war) had now joined in the pipeline construction in southern Italy. In nine months, the 697th alone would construct a very large and elaborate network of pipelines and storage facilities. Besides the several airfields around Foggia, the 697th also supplied fuel to 14 other airfields. In addition, the company constructed 43 10,000-barrel tanks and 31 smaller tanks during this time. The 697th, 696th, 701st, 702d, and 704th Petroleum Distribution Companies together constructed 651 miles of pipeline to the airfields and storage facilities in that area of Italy.

On 15 July, the 697th moved out of Foggia to a staging area in preparation for Operation Dragoon, the invasion of France by Allied forces from Italy. D-Day was 15 August and by 16 August the 697th was established at Saint-Raphael, France, receiving materials to begin construction of the unloading facilities on 19 August. The project, which was completed by 30 August, included—

- Tanker discharge lines.
- Three 10,000-barrel storage tanks.
- A 1,000-barrel storage tank.
- Three miles of pipeline to the terminal.
- Three separate racks to fill tanker cars, drums, and cans.

Also, tanker-truck and drum-filling racks were constructed at the airport at Fejus, France, and connected to the port by six miles of pipeline.[6]

Photo courtesy U.S. Army Engineer School

A Soldier closes a valve near the start of the Rhône River pipeline near Marseilles, France. September 1945

It was decided before the invasion that the three refineries and the excellent port at Martigues would be the starting point for a pipeline up the Rhône Valley. On 25 August, an advanced element of two officers and 89 enlisted Soldiers from the 697th went to Martigues, bypassing Marseille and Toulon, which were still under German control. The French had just liberated the town and the Soldiers of the 697th were the first Americans the townspeople had seen. Flares and artillery fire lit the sky the first night since the Germans were still to the west, north, and east. Small units of German soldiers were reported in the area, so the detachment posted extra security on all sides. At this time, the United States Seventh Army engineers established a pipeline operations office at the La Mede refinery, which served as the main office for operations for the next 11 months.

Immediately, the 697th started to refurbish and connect all the refineries into one large storage facility. Difficulties were encountered in the harbor because the Germans had blown bridges and collapsed them into the harbor, which was mined extensively. The first Allied tanker to arrive, on 9 September, was saved from a mine only because the tugboat that was guiding it hit the mine first. The 697th would have lost a detachment of men, and the Lavera refinery could have been seriously damaged, if the mine had blown up the larger ship. While all this was being done, the 697th had a survey crew out locating the track for the pipeline to move north, up the Rhône Valley. On the same day the tug blew up, the first sections of pipe were laid.

From Martigues to Avignon, Valence, Lyon, Dijon, then northeast through Epinal to Sarrebourg, the 696th, 697th, 701st, 784th, 1385th, and 2814th leapfrogged along the Rhône Valley. Each company completed a section and connected with the next company's completed section. The companies were responsible for laying the pipeline and constructing the dispensing terminals along their routes. An example of this was the first section laid. In 16 days, the 697th laid 35 miles of pipeline from Martigues north to the Durance River, crossing the river southeast of Avignon. That section joined up with a section already completed by the 696th, just north of that crossing. Meanwhile, the base camp would remain in place until the pipeline bypassed it, making it impractical to communicate with the units. Then the base camp would move up the line another 50 miles and the process would repeat itself. This proved to be a fast, efficient method to get the projects completed.

It wasn't always a cakewalk for the companies. Sudden heavy rains caused flooding and rapid currents on the rivers, which caused loss of life and material. The terrain was not always flat and easy to cross. The fueling points took time to construct, and captured storage areas often were in dire need of major repairs due to neglect and sabotage. For example, how do you convert an old molasses plant into a fuel storage facility? The winter of 1944-45 was extremely cold with heavy snowfalls, which slowed progress. Crossings that would normally have been dug by pick and shovel had to be blasted out of the frozen terrain. Mines and other hazards were always present. When the companies reached Sarrebourg, France, in January 1945, they could take a break. They had caught up to the rapidly advancing Allied lines, and the Germans had not yet been cleared out of the area west of the Rhine River.

The pipeline companies were accomplishing their mission. By the spring of 1945, "The daily gasoline consumption of the (United States) Seventh Army ... exceeded 600,000 gallons, and that of the French First Army only slightly less. Nevertheless, shipments of gasoline matched these expenditures and maintained adequate reserves in both armies at all times." [7]

In September 1944, the 696th started laying a 6-inch pipeline from the Mediterranean, parallel to the 4-inch line laid earlier by the 697th. It was March 1945 before it reached Sarrebourg. By the end of January, the 4-inch line was already delivering fuel all the way from the sea to Sarrebourg. After the Allied spring offensive drove the Germans east across the Rhine, the 697th began to run a pipeline from Sarrebourg to Sarreguemines, France, where the pipeline turned east and crossed into Germany. The pipeline went up to the Rhine River just north of Frankenthal, near Mannheim. The 696th had prepared a crossing by putting a Bailey bridge across the river on existing pylons. The first 4-inch pipeline reached the Rhine on 20 April 1945. By the end of April, fuel was being pumped from the Mediterranean to Germany at a rate of 10,000 barrels, or 550,000 gallons, daily. Since the pipeline system up the Rhône Valley in France and across the Rhine River into Germany had become so expansive, the 697th spent the rest of the war maintaining and operating the pipeline.

The statistics compiled in Europe by this company are extraordinary. From 9 September 1944 to 20 April 1945, the 697th alone constructed 347 miles of pipeline, surveyed another 519 miles of pipeline, strung 412 additional miles of pipe, rehabilitated or erected facilities for 419,600 barrels of storage (the equivalent of 42 10,000-barrel storage tanks), rehabilitated or erected 12 dispensing points, and crossed three major rivers.[8] The Soldiers who had served from the beginning were awarded stars for five campaigns:

- Algeria-French Morocco
- Tunisia-Sicily
- Naples-Foggia
- Rhineland
- Southern France Invasion arrowhead

The unit also was commended for its work at Foggia, Italy.

After the end of the war in Europe, the 697th was decommissioned due to lack of manpower. Its last assignment was to back-flush the pipeline with water, then tear down the pipeline from the Rhine River all the way back to the Mediterranean Sea. No records have been found describing how far the company got on disassembling the pipeline system before being sent home. The 697th received orders on 8 October 1945 to leave the European Theater of Operations for the States. It left Southhampton, England, on 24 November and arrived in New York on 30 November. The unit was deactivated on 1 December 1945.

Endnotes

[1] United States Army in World War II, *The Corps of Engineers: Troops and Equipment*, 1958, Chapter XVIII, p. 417.

[2] Ibid., p. 418.

[3] Colonel James E. McNary and Colonel Edson W. Berlin, *History of the Development of Military Pipelines*, 28 December 1945.

[4] Reorganization for Global War, Table 10, *Number and Strength of Engineer Table of Organization Units*, 30 June 1945.

[5] The 2656th was a typical pipeline company, and its history is used since there is a large amount of information available on it. This is not meant to take away from the contributions of all the other companies. It is easiest to tell the whole story by focusing on one unit that went the distance, from 1943 to 1969.

[6] William D. Trethewey, *A History of the 697th Petroleum Distribution Company*, 1989, p. 18.

[7] Ibid., p 30.

[8] Ibid., p 31.

Mr. Petty, a farm boy from Iowa when he enlisted in the Army in 1966, spent his three-year Army career in pipeline companies. After leaving the Army, he graduated magna cum laude from Iowa Lakes Community College, which offered a farm equipment mechanic's course. He has been a mechanic for 34 years and is still very interested in the pipeline experience.

Acknowledgement

Thanks are extended to William Trethewey for saving this history. It stands as a testament to the hard work done by the engineers in World War II and those of the "Greatest Generation." It is on record at the archives at the United States Army Engineer School at Fort Leonard Wood, Missouri.

This is Part I of a two-part article. Part II will cover the pipeline story from the postwar years in Europe, to Operation Sledgehammer in the United States, to operations in Thailand, Vietnam, and the Persian Gulf.

News and Notes

Korea's Peninsula Engineer Conference 2008

United States Forces Korea (USFK) invites engineers to participate in this year's Peninsula Engineer Conference (PEC) from 29 January through 2 February 2008 at the Yongsan Dragon Hill Lodge in Seoul, Korea. This year's theme is *Engineer Solutions Through Innovative Technologies*. USFK encourages those with cutting edge ideas, inventions, or techniques to speak to the audience or to sponsor a display. The PEC will feature civil engineering and classified "warfighter" sessions, historical tours, and a 5K fun run. Adjunct to the PEC, the Society of American Military Engineers (SAME) will host a luncheon and a United States – Korea Engineer Ball.

See <*http://posts.same.org/korea/*> for more details. Individuals or organizations interested in attending may contact Mr. Tom Brady at USFK engineers; e-mail <*thomas.m.brady@korea.army.mil*> or call DSN 315-723-3260.

Annual Unit Histories

Each year, engineer units—as well as other Army units—complete annual histories. In the past, these have been submitted to higher headquarters and eventually lost. A recent revision of AR 870-5, *Military History: Responsibilities, Policies, and Procedures*, dated 21 September 2007, instructs units to send a copy of their annual history to their branch history office. This not only allows those offices to maintain a collective branch history but also assists them in their efforts to maintain unit histories, lineages, and honors. If you have any questions concerning annual or unit histories, contact Dr. Larry Roberts, Historian, United States Army Engineer School, at (573) 563-6109 or <*larry.roberts1@us.army.mil*>.

Mine Detection Moves Into the Future:

The AN/PSS-14 Mine Detector Requires a License

By Mr. David Holbrook

The AN/PSS-14 Mine Detecting Set is more advanced than any metal detector used for mine detection. The AN/PSS-14 mine detector is only one part of this remarkable mine detection system. The other, and more essential, part of this system is the operator. The complexity of the system requires operators to be licensed to ensure safe and effective operation. For that reason, and for the safety of all personnel involved in route and area clearance operations, commanders must ensure that each operator is properly licensed before using the system in a real-world situation. Licensing operators of the AN/PSS-14 is essential to ensure that both the operator and the mine detector are adequately sustained so they will perform as intended.

Basic Operational Theory

The AN/PSS-14 mine detector applies two technologies—metal detection (MD) and ground-penetrating radar (GPR). The AN/PSS-14 employs aided target recognition algorithms that alert the operator of the presence of a target of interest. A trained and licensed operator learns to mute the MD or the GPR to identify objects buried in the ground, pinpoint their location, and determine if they are potential mines. A trained and licensed operator can detect metal objects in the ground and investigate them using the GPR. The GPR can be used to distinguish potential mines from battlefield clutter and other metal debris.

AN/PSS-14 Fielding

The first step in the fielding process is to educate units on the system's requirements. The Product Manager (PM) for Countermine and Explosive Ordnance Disposal sends a team to the unit's location to conduct a new material introductory briefing. During this briefing, the PM's representative explains the system's capabilities, sustainment requirements, licensing requirements, and available training devices. The primary goal of the briefing is to ensure that commanders lock in time on their training calendar for both the new equipment training (NET) and the unit master training (UMT). The PM has provided the means for every unit that is authorized the AN/PSS-14 to receive the proper training. Before a unit is issued its mine detectors, it must have an appropriate number of "qualified operators."

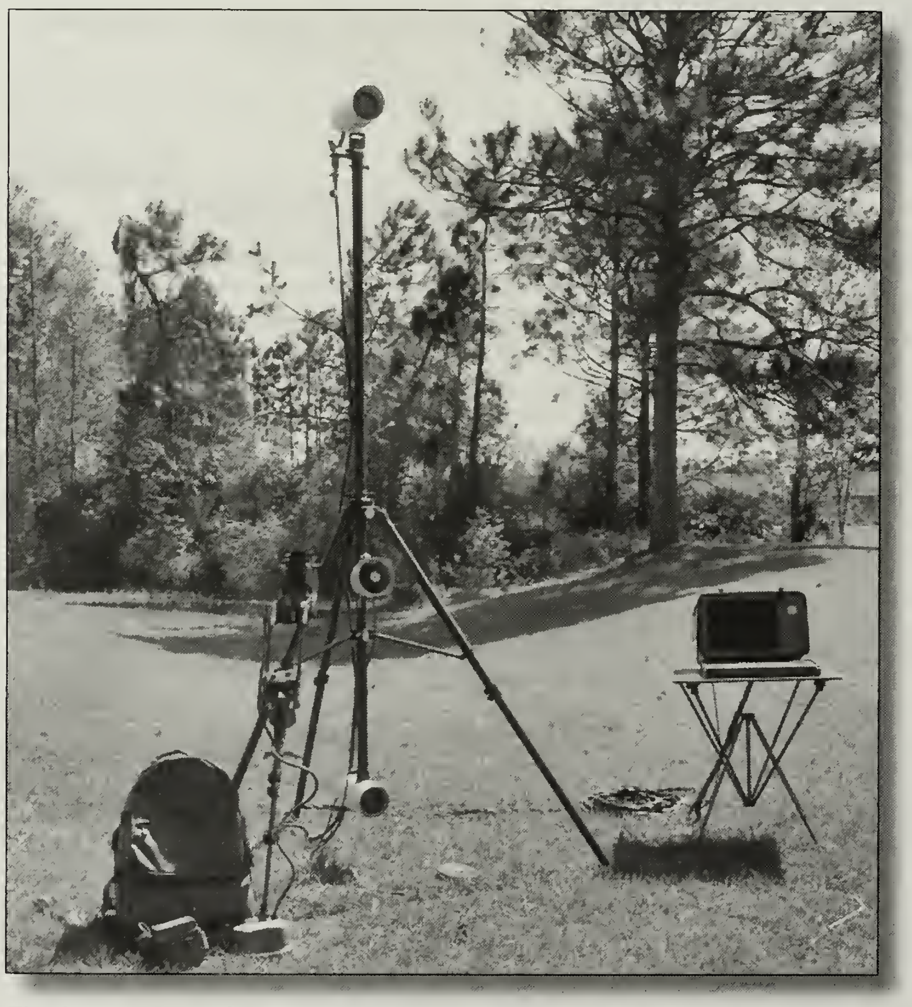
Training

Both the NET and the UMT are 40-hour courses and are conducted either at the unit's home station or at Fort Leonard Wood, Missouri, whichever is more convenient for the unit. Once the unit locks in the training dates, the NET team arrives at the unit's location, sets up the training site, and begins training. After successful completion of the 40-hour course, the NET team issues the equipment, and the Soldiers who attended the training are considered qualified to operate the system.

Soldiers are being graded on their sweeping techniques at a UMT course.

The requirement is to send one Soldier to NET for each AN/PSS-14 being issued. However, units are encouraged to take advantage of on-site NET by sending as many Soldiers in grade E5 or above as possible, so that those who qualify as operators can take the additional training to become unit master trainers. Otherwise, the Soldiers will have to attend a separate 40-hour operator course before attending UMT.

The UMT course, which is taught by United States Army Engineer School-trained master trainers, is conducted to provide a sustainment capability to each unit issued the AN/PSS-14. Units are encouraged to send as many qualified sergeants to this training as possible. These individuals will develop unit standing operating procedures (SOPs) and conduct new operator and refresher training after the fielding process is complete. It is because of the licensing requirement for this system that UMT course attendees must be E5s or above.

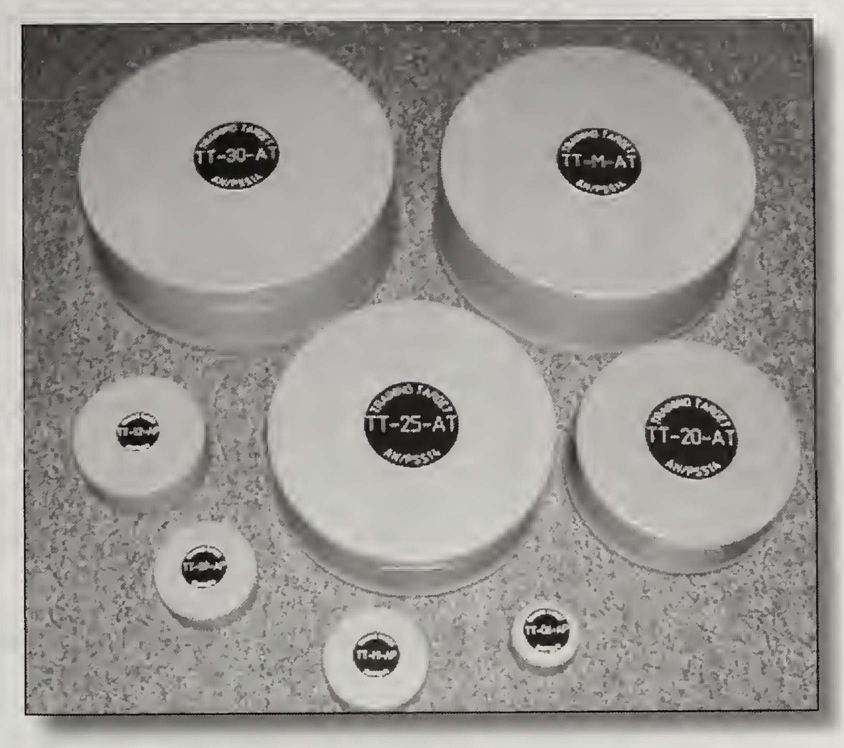


The Sweep Monitoring System (SMS) is a training aide that provides Soldiers with immediate feedback on their sweep techniques.

Licensing

Officials at the Engineer School believe that any equipment designed to detect explosives, mines, or other hazards must have a licensing requirement associated with it. Since the proper use of this equipment will prevent the death or injury of Soldiers, the licensing requirement ensures that personnel are proficient in using it. The current Army Regulation 600-55, *The Army Driver and Operator Standardization Program*, requires military personnel and Department of the Army civilians to have an Optional Form (OF) 346, *United States Government Motor Vehicle Operator's Identification Card*, and demonstrate their proficiency to operate mechanical or ground support equipment, including "mine-detecting equipment, truck-mounted—all makes and models," and "miscellaneous equipment, any equipment determined by the local commander or higher authority to warrant licensing, such as . . . detecting sets, mine portable, AN/PRS-7 and AN/PSS-11."

The Engineer School has recommended changes to the regulation to clarify the licensing requirement for the AN/PSS-14. The first draft of these changes was sent out for review and the final version is scheduled for publication in early 2008. Recommendations include that "all military personnel must have a certified OF 346 or DA Form 5984-E and demonstrate their proficiency to operate mine-detecting or other explosive-detecting equipment, to include all portable, hand held, and truck-mounted models (including, but not limited to, AN/PSS-12 and AN/PSS-14)."



Training Target Sets (TTS) are used to simulate live mines for AN/PSS-14 training.

Summary

It is imperative that commanders become familiar with the capabilities of the AN/PSS-14. This system is essential in safe route clearance operations in the current theater of operations and in future conflicts. The Engineer School has provided all the tools required to establish a successful training and licensing program, to include providing units with a draft SOP for adoption and immediate implementation. The product manager has an aggressive fielding schedule for the AN/PSS-14 for the next few years. Units that do not already have NET and UMT on their schedules should contact Mr. Rob Sellmer, AN/PSS-14 Fielding Manager, at 703-704-3397, DSN 654-3397, <*robert.sellmer@us.army.mil*> for NET and Mr. John Sullivan at 573-563-7646 or cell 573-528-9081 for UMT immediately to ensure that they are ready to deploy with the best route clearance capabilities possible.

Mr. Holbrook is a retired engineer lieutenant colonel and former battalion commander. He currently works as a senior analyst for BRTRC Research Corporation at the Fort Leonard Wood, Missouri, office.

Dedication

The following members of the Engineer Regiment have been lost in the War on Terrorism since the last issue of *Engineer.* We dedicate this issue to them.

Chitjian, Private First Class Adam J.	3d Battalion, 8th Cavalry Regiment, 1st Cavalry Division	Fort Hood, Texas
Kelsey, Sergeant Samuel E.	3d Battalion, 7th Infantry Regiment, 3d Infantry Division	Fort Stewart, Georgia
Lahmann, Corporal Johnathan A.	59th Engineer Company, 20th Engineer Battalion, 36th Engineer Brigade	Fort Hood, Texas
Lambert, Specialist David E.	237th Engineer Company, 276th Engineer Battalion, 91st Troop Command	West Point, Virginia
McGovern, Captain Timothy I.	2d Battalion, 7th Cavalry Regiment, 1st Cavalry Division	Fort Bliss, Texas
Mele, Sergeant John W. II	1st Battalion, 30th Infantry Regiment, 3d Infantry Division	Fort Stewart, Georgia
Smitherman, Specialist Brandon W.	2d Battalion, 7th Cavalry Regiment, 1st Cavalry Division	Fort Bliss, Texas

Sapper Pac –
The Tool Kit for Engineers

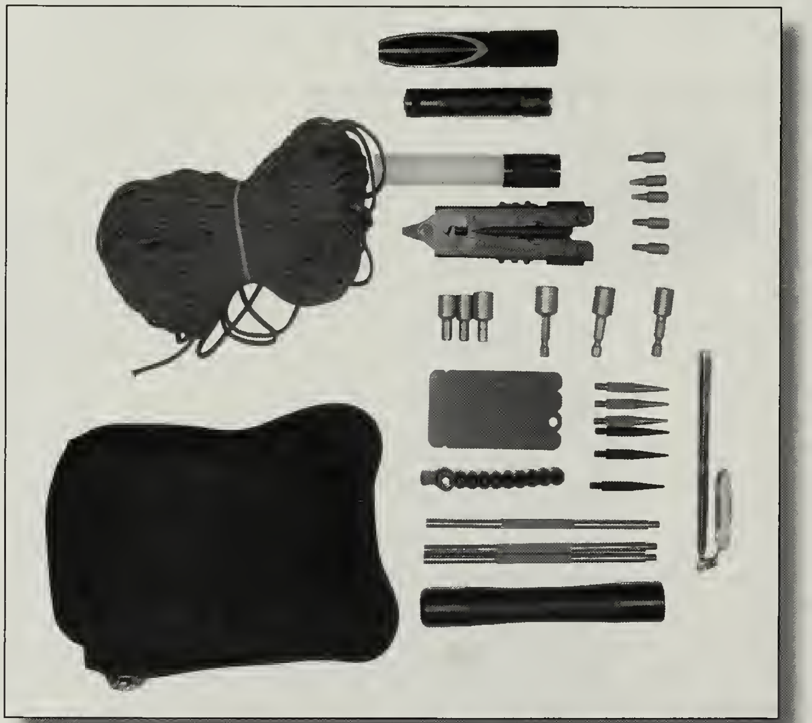
By Mr. Alan P. Schlie

Engineers are almost universal in their agreement to carry some tool on their belt or in their pocket. The most popular tool seems to be multi-pliers, with hundreds of types available from numerous manufacturers. The second most popular would probably be a tie between a pocketknife and a flashlight. Tool points and nut drivers would come in handy and can be attached to one of the multi-pliers' stems. Other tools are more specialized and might include a mine probe or a trip wire grapnel with throwing cord or a compass.

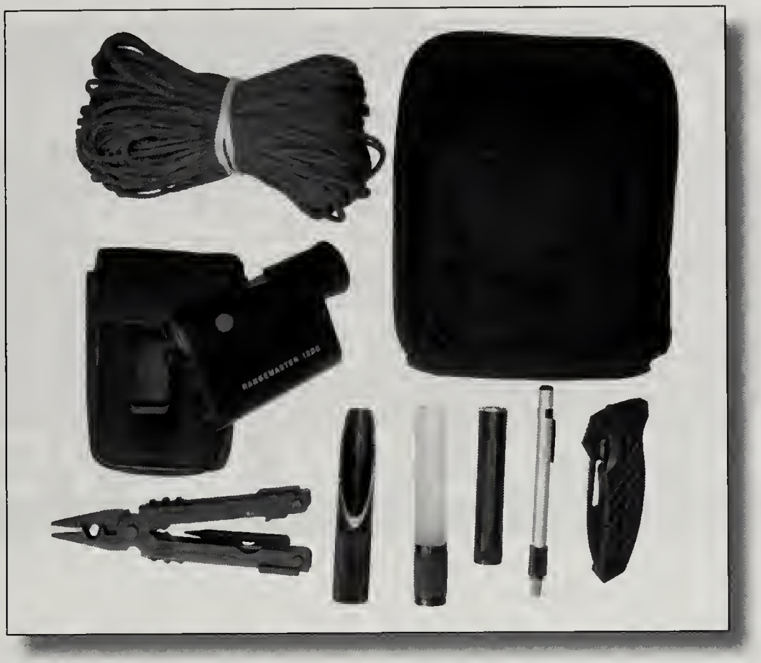
Considering the variety of situations a Soldier encounters in which a tool is needed, these are all good choices. But until now, each was carried individually or tossed into a pouch, presenting its own hazards. This is no longer the case; the United States Army Engineer School and the Program Manager for Sets, Kits, Outfits, and Tools (PM-SKOT) teamed to create the Sapper Pac as a Soldier Enhancement Program (SEP) initiative and placed the tools into a zippered pouch that allows easy access and prevents the items from inadvertently falling out while digging around for something else. The bags are modular lightweight load-carrying equipment (MOLLE) compatible and available in black or Army combat uniform (ACU) camouflage pattern.

There are three versions of the Sapper Pac—one for sappers, another for squad leaders and platoon sergeants, and a third for platoon leaders. The Sapper Pac contains Gerber demolition explosive technician (DET) multi-pliers with numerous tool points and nut drivers, an Inova X1MT flashlight designed with a wand attachment for signaling and a stake attachment for planting in the ground, a sectionalized mine probe with shaft extensions and multiple metal and plastic tips, a credit card-size bendable trip wire grapnel with 15 meters of 550 cord, an inspection mirror, and a thumb saw that cuts through wood and metal. In addition to that, there is still room in the Pac for a memorandum book, a pen, a small tape measure, and a carabiner.

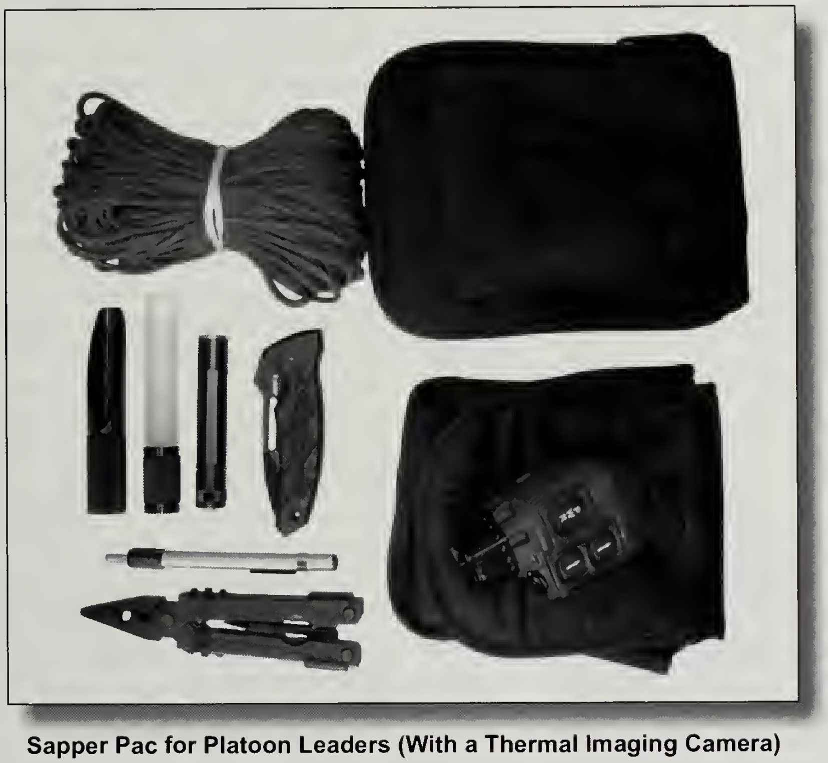
The Sapper Leader Pacs contain the same multi-pliers, flashlight, and tape measure. In addition, there is a folding saw with a full-length serrated blade for cutting wood and metal and a pencil-style knife sharpener. The difference between the two Pacs is that the squad leader version includes a Leica Laser Range Finder (LRF) that is accurate to 1,200 yards, and



Sapper Pac



Sapper Pac for Squad Leaders (with a Laser Range Finder)



Sapper Pac for Platoon Leaders (With a Thermal Imaging Camera)

the platoon leader version includes an Insight® Technology Thermal Imaging Camera (TIC) with software to download the video captured to any laptop.

Sapper Pacs will become components of Squad Pioneer Tool Sets and be available in clothing sales stores in the near future, but units can obtain them now by using the following National Stock Numbers (NSNs):

Sapper Pac	5180-01-538-4213
Sapper Leader Pac (Squad)	5180-01-542-1075
Sapper Leader Pac (Platoon)	5180-01-539-5597

For more information, contact the Item Manager at (309) 783-0131, or e-mail <*dan.stark@conus.army.mil*>.

Mr. Schlie recently retired as a force documentation analyst with the Capabilities Development & Integration Directorate (CDID), United States Army Maneuver Support Center, Fort Leonard Wood, Missouri. A retired command sergeant major, he served in various capacities in Europe, Korea, and the continental United States throughout his career.

ORGANIZATIONAL LEADERSHIP AT THE BATTALION LEVEL

By Lieutenant Colonel Laurence M. Farrell

"Get your communications up or you're fired," said the brigade commander. The words stung. As the battalion commander stood in front of the brigade commander, he was deeply disillusioned. The brigade's communications structure had failed during the exercise, and the brigade commander wanted to know why. The battalion commander could not provide an answer. Even worse, he had no suggestions on how to improve the communications structure. He wondered how this had happened. Ninety days ago, he was an engineer battalion commander with technical knowledge in bridging, construction, and demolitions. Since that time, his battalion had converted to a brigade special troops battalion (BSTB) structure, and his technical knowledge of his subordinate commands was nonexistent. As the higher command headquarters of the brigade's signal company, he was responsible for the communications posture of the brigade. He felt mixed emotions. He regretted that he had not created a formal plan to learn more about the communications structures and the capabilities of the signal company. And he was angry that he was being chastised for the exacting details of signal requirements when, as an engineer officer, his knowledge of this area was minimal. Finally, he resolved to fix the structural issues in his battalion that had allowed the situation to happen.

This scenario actually occurred to a commander of a BSTB immediately after it converted from an engineer battalion. As part of the modular force structure, the Army has created the BSTB and the divisional special troops battalion (STB). The BSTBs and STBs usually contain, at a minimum, four disparate units at the company and platoon levels. The following are examples of how they may be configured in the current force structure at the divisional level and below.

- BSTB (military intelligence, signal, chemical, military police)
- STB (signal, security, adjutant general replacement, tactical command post/tactical operations center [TAC/TOC] support, and the band)

These units require a different leadership style than a combined arms battalion that contains combined arms companies and a similar combat engineer company. For leaders to be more successful at commanding a BSTB or an STB, current leadership doctrine should be fully understood and specific procedures should be followed.

According to Field Manual 6-22, "Leadership is the process of influencing people by providing purpose, direction, and motivation, while operating to accomplish the mission and improving the organization."[1] The Army officially classifies leadership into three levels: strategic, organizational, and direct (see figure, page 45).[2] Each leadership level requires a different leadership focus while upholding the Army's eight core leader competencies and supporting behaviors described in FM 22-6.[3] At the battalion level, in most cases, direct-level leadership is still the preferred method. Most field grade leaders at the battalion level (commander, command sergeant major, executive officer, and S3) have always led at the direct level (platoon and company). That direct-level leadership lends itself to "like" units, and a battalion—even in today's modular environment—still has a moderate footprint. It is when the battalion command team leads a unit at the direct level that should be led at the organizational level that structural deficiencies become possible.

Leading at the organization level is a new and challenging experience for most field grade officers and noncommissioned officers. The Army's leadership manual reflects this challenge by stating that "organizational leaders generally include military leaders at the **brigade through corps levels"** [emphasis added].[4] The manual also states that "organizational leaders usually deal with more complexity, more people, greater uncertainty, and a greater number of unintended consequences."[5] This article provides a short, comprehensive list of techniques and focus areas that are effective at the organizational level of leadership and are directly applicable to divisional BSTB and STB commanders, command sergeants major, executive officers, and S3s. This article also recommends potential solutions the Army can implement on a long-term basis to improve the performance of the BSTBs and STBs.

Organizational Level Techniques

The following techniques are effective at the organizational level of leadership:

- Understand the technical requirements
- Know the core competences
- Conduct routine counseling
- Provide a vision

Understand the Technical Requirements

Leaders at all levels must have a basic understanding of the technical requirements of their subordinate units. This is one of the greatest challenges of BSTB and STB field grade leaders, and they often neglect or minimize it for multiple reasons, to include:

- They may discount their role as technical advisors of a battalion-sized element.
- They may think that they do not have time to learn new technical skills.
- They may decide that fully delegating the technical part of their duty performance is acceptable.

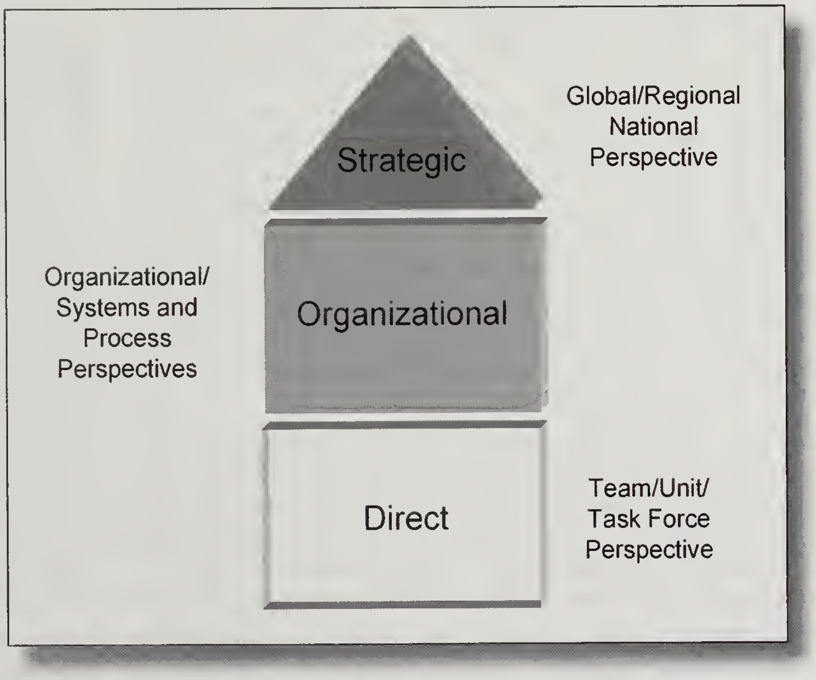
These perspectives, though seemingly reasonable, are not in keeping with current Army doctrine. To put it bluntly, leadership requires a technical component. This is clearly stated in FM 6-22: "Direct, organizational, and strategic level leaders need to know what functional value the equipment has for their operations and how to employ the equipment in their units and organizations. At higher levels, the requirement for technical knowledge shifts from understanding how to operate single items of equipment to how to employ entire systems."[6]

This paradigm is also reinforced by the guidance given during a recent lieutenant colonel command board. Military Personnel (MILPER) Message 06-210 states that "officers will be slated per the Army command/key billet guidance prioritizing skills and experience… officers should consider how their skills and experiences best match those commands or key billets available and make preferences that best match their personal desires to where their skills and experiences exist. Officers should focus on specific or like-type units where they have previously served and not necessarily the location."[7]

The guidance and doctrine are clear. Leadership has a technical component, and it is relevant at the higher command levels. The challenge is to implement a program that trains field grade leaders. At the organizational level, a simple solution is a comprehensive leader development program. The value of a long-term leader development program should not be discounted. A focused program of instruction, with hands-on training with proper training aids, can result in a high degree of technical competency in a relatively short amount of time. The United States Army Engineer School uses this method to teach complex engineering subjects—such as the analytical bridge classification method in the Captains Career Course—to many officers with no engineering experience. This process can be replicated at the battalion level for a variety of topics. Finally, most divisional life cycle units experience their turnover immediately after a deployment and then are refilled and held steady for about three years. This situation further allows the "in-house" training program to be spread out over a longer time period.

Know the Core Competences

Leaders at the organizational level must focus on the unit's core competencies to have the greatest effect. This dictum has even more relevance if the unit is composed of disparate subunits such as in the BSTB and STB. In a maneuver battalion, with four like subunits, the battalion leadership can choose a variety of military occupational specialty (MOS)-specific tasks to devote training time, energy, and resources. Here, the commitment of resources has an economy of scale and an immediate effect across the battalion. This is not the


Strategic
Global/Regional National Perspective
Organizational/ Systems and Process Perspectives
Organizational
Direct
Team/Unit/ Task Force Perspective

Army Leadership Levels (Figure 3-3 from FM 6-22)

"Leaders at the organizational level must craft a vision and consistently reinforce it throughout the command."

case in a BSTB or an STB. In them, the battalion leadership usually does not have time to generate multiple distinctive training programs for each company. The essential question is, Where can the battalion leadership leverage their experience to maximize the training? Fortunately, the Army provides the answer— the 40 Warrior Tasks and 11 Battle Drills. According to the Chief of Staff of the Army, these Warrior Tasks and Battle Drills "illustrate warrior-focused training" in support of the "long war."[8]

In units such as the BSTB or STB, where there are always competing demands for specific MOS training and combat training, the battalion leadership is critical in providing a balance between these two competing demands. Finally, in focusing on the Warrior Tasks and Battle Drills the battalion leadership can conduct battalion ranges and minimize risk. The value of this effect cannot be overestimated. Many subunits in a BSTB or an STB have limited exposure to the requirements of live fire ranges and require battalion-level support to execute the range properly and safely.

Conduct Routine Counseling

In BSTBs and STBs, the battalion leadership must conduct written, deliberate performance counseling "routinely." This counseling requirement has added importance if the units are geographically dispersed—as most BSTBs and STBs are. Though FM 6-22[9] and DA PAM 623-3[10] clearly state the Army counseling requirements, many battalion-level leaders and above do not fulfill the requirements according to the regulation. Written counseling is often replaced with verbal counseling that is conducted *ad hoc*. Though verbal counseling can be effective, its application is usually limited to direct-level leadership of like units. For example, it is easier for a maneuver commander to give guidance to a subordinate maneuver unit that needs to improve the company's score on "Table 8 Gunnery" than it is for a BSTB commander to give guidance on a communication problem. Though this might not be "fair," it is the reality.

In units such as BSTBs and STBs, written counseling serves as the intent paragraph similar to the operations order. According to FM 6-22, counseling "communicates standards and is an opportunity for leaders to establish and clarify the expected values, attributes, and competencies."[11] Since the battalion commander and command sergeant major have limited time, exposure, and probably technical expertise, the counseling provides a "compass" for priorities for the long term. This is key for an organizational leader to be effective.

Provide a Vision

Leaders at the organizational level must craft a vision and consistently reinforce it throughout the command. Often a vision is the "shortest leg" and most neglected of the "command triad" (command philosophy, training guidance, and command vision). Unlike training guidance—which must be issued quarterly and validated at the quarterly training brief—there is no defined metric that measures if a unit is making progress toward the vision. Unlike a command philosophy, which tends to be more specific in nature, command vision statements tend to be "nebulous." The result is often a PowerPoint® slide put up in the battalion headquarters and then ignored. The vision, when properly utilized, provides clarity to the command's purposes. It shows junior-level leaders what the organizational long-term goals are in the unit. The vision has added importance in BSTBs and STBs. Unlike a maneuver unit, where Soldiers clearly see that they are part of a larger team working toward common goals, Soldiers in a BSTB or STB may feel that they are operating independently from the other companies in the battalion. An organizational vision serves as a unifying tool that allows Soldiers to see that they have common goals regardless of their MOS.

Army-Level Solutions

Potential solutions at the Army level, such as the following, can improve the performance of BSTBs and STBs:

- Create a DA-certified BSTB/STB field grade leaders course
- Create a BSTB/STB identifier

Create a DA-Certified BSTB/STB Field Grade Leaders Course

The Army should create a field grade leaders course for both officers and field grade senior noncommissioned officers assigned to BSTBs and STBs. Although there is tremendous value in having a functional, enforced officer professional development (OPD) program at the organizational level, there are limitations to this approach. Similar to most units, personnel will have competing demands on their time, all units are susceptible to last minute requirements and, most importantly, a DA-centralized course creates a common skill set across the Army and standardizes the basic requirements of field grade leaders in BSTBs or STBs.

Prior to modularity, the divisional "slice" battalions trained and maintained their respective units and then attached these units to the maneuver commander for employment. The senior leaders of these battalions were experts in their respective fields and honed their skills to better train and mentor their subordinates. That specific function of mentoring subordinates on technical and maintenance requirements is extremely difficult without a formal training program provided by the Army. It is impossible to mentor someone on something that you are not familiar with.

The field grade leader training course would be approximately three to four weeks long with each branch or "module" having one week of dedicated training time. (The Army already embraces the concept of specific training courses for commanders and command sergeants major in courses such as the Garrison Precommand Course at Fort Belvoir, Virginia, and the Recruiting Precommand Course at Fort Jackson, South Carolina). Although three to four weeks might seem excessive, the Reserve Component Captains Career Course is seventeen days long and covers one branch with a tactical focus. The BSTB course would cover tactics as well as maintenance issues. That the Army has multiple preestablished ongoing training courses for stateside garrison commands, but not for complex units going into combat, is an "oddity" that should be corrected.

Create a BSTB/STB Identifier

The Army should create a BSTB/STB identifier and use the identifier in placing officers and noncommissioned officers that have been selected to command at the battalion level. According to MILPER message 06-210, the Army is placing priority on assigning officers and noncommissioned officers in units where they have previously served.[12] This criterion should formally extend to the BSTBs and STBs. Having commanders that have served previously in a BSTB or an STB, and that have completed the BSTB/STB certification course, would solve the problems described above in mentoring junior leaders concerning training and maintaining equipment. This has great value both up and down the chain of command. Not only does it bond the junior leader with the senior officer and noncommissioned officer, but it also prevents situations such as the one described in the scenario at the beginning of this article.

Summary

Commanding a BSTB or an STB is a challenging experience. For many battalion-level leaders, it is the first time in their Army career that they are leading Soldiers with different skill sets from their own, are geographically dispersed, and belong to distinctive subunit companies. In this type of unit, the battalion leadership is leading at the organizational level. At this level of leadership, leaders must follow doctrine as the foundation for their actions. Though there are actions that the battalion leadership can implement to address the complexity of this organization, such as a focused OPD program, I believe that ultimately the Army should create a BSTB/STB certification course. This course would quickly and significantly enhance the technical and tactical knowledge of the field grade leaders in these units, enhance the mentoring process and leader development that occurs for the battalion command team and, most importantly, increase the combat capacity of these units.

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Endnotes

[1] FM 6-22, *Army Leadership*, 12 October 2006, p. 1-2.

[2] Ibid., pp. 3-6 and 3-7 and Figure 3-3.

[3] Ibid., p. 2-7.

[4] Ibid., paragraph 3-39, p. 3-7.

[5] Ibid., paragraph 3-40, p. 3-7.

[6] Ibid., paragraph 6-36, p. 6-7.

[7] MILPER Message 06-210, *FY08 Lieutenant Colonel Army Competitive Category Centralized Selection List*, issued 28 July 2006, page 7.

[8] Chief of Staff of the Army speech at the Association of the United States Army (AUSA) Convention, 10 October 2006.

[9] FM 6-22, Appendix B.

[10] Department of the Army Pamphlet 623-3, *Evaluation Reporting System*, 10 August 2007.

[11] FM 6-22, paragraph B-17, page B-3.

[12] MILPER Message 06-210, page 7.

Note: The opinions expressed in this article are those of the author and do not necessarily reflect the official policy or the positions of the United States Army Engineer School, the Maneuver Support Center, the United States Army, or the Department of Defense. The author invites your feedback concerning current BSTB and STB employment and past experiences for a follow-on article. His e-mail address is *<laurence.farrell @us.army.mil>*.

A Private's Life

My Journey Through the Second World War

By Mr. Murray Mendelsohn as told to Dr. Christopher Hennen

June 6, 1944, began just like many other days at Camp Rucker, Alabama. It was sunny and hot—normal for Alabama—and after the usual morning chores, word came that there was to be a battalion meeting at the post movie theater—another normal occurrence. But there was one thing that set that morning apart—rumors were rampant that the long-awaited Allied invasion of France had begun to liberate Europe from Nazi occupation. We were an anxious group of Soldiers; we had finished our training and were anticipating orders for a trip overseas. The only question seemed to be which theater—European or Pacific?

Our 159th Engineer Combat Battalion commander, Major Michael F. McNamara, strode in and took center stage, his normal position. The major came right to the point: The invasion had started in Normandy earlier that morning, and he was only sorry that the 159th had missed out on the glorious event. But he assured us that there was a second wave coming, and we would be part of it.

After leaving the theater, we tried to go back to our daily routine. Now we knew our days at Camp Rucker were numbered. There was still talk about the direction in which the battalion would go, but the betting seemed to be on Europe because of the invasion. All furloughs were cancelled, meaning I would not get the one that had been promised me after completing my training at the Fort Belvoir, Virginia, Engineer Replacement Training Center in April. After that training, many of us had been sent to the 159th, knowing that the outfit was preparing to go overseas and had to be numerically strengthened. At Camp Rucker, we were blended into the unit, a group that had been together for more than a year and seemed to be ready for its ultimate mission of being combat engineers.

Major McNamara was right—we were going to be part of the second wave in Normandy. In a matter of a few days, we were restricted to the base, and the packing process was well underway. Then the order came to move out. We were taken to the railroad and boarded a train for the ride to the port of embarkation. We had Pullman cars, so we knew it was going to be a long ride.

The train finally reached its destination at Camp Myles Standish, near Taunton, Massachusetts. We were taken to our last U.S. posting, assigned our slots in the barracks, and given passes to go into either the neighboring towns or to Boston. We decided to take advantage of our borrowed time while we could. Who knew when—or if—we'd have a chance to enjoy ourselves like that again.

Then came the announcement we had both expected and dreaded: We were restricted to the base, which could mean only one thing. On the night of June 26, we boarded our train, which left us alongside a hulking, darkened ship that was moored to a South Boston pier. We picked up our duffel bags and boarded the ship—the *USS West Point.* It was a luxury liner that had been converted in 1940 as the flagship SS America of the United States Line fleet, sailing between New York and England and France. Now it was a U.S. Navy troop transport, painted battleship gray and with U.S. Sailors manning guns posted around the ship.

United States Navy photo

The *USS West Point*, a converted luxury liner that was completed in 1940 as the flagship *SS America* of the United States Line fleet, sailed between New York and England and France. Now it was a United States Navy troop transport, painted battleship gray and with U.S. Sailors manning guns posted around the ship. 1943

Once aboard, we kept trudging downward, finally reaching our bunks. We had some 10,000 Soldiers on board, mainly engineers and Medical Corps people, we were told. We were stacked three and four high but, as we had long-since learned, when it was time to call it a day, we went to sleep. When we awoke and finally got up on deck, we were already far out to sea. Standing near the stern, we could see that the ship was pursuing a zigzag course, and we were all alone on the Atlantic.

Finally, on the morning of July 4, 1944, after sailing for seven days, we could see seagulls and then land, which we were told was Scotland. Many of us had thought we would undergo further training, but that was not to be. Instead, every few days we packed up and headed farther south. By July 15, we had reached Falmouth, an old fishing port on the English Channel. We had large squad tents right near the water, where we could see many ships waiting to load up. It was only a matter of time before we would be heading to Normandy.

Our waiting came to an end on July 18, when the battalion boarded two waiting Liberty ships, the *Louis Kossuth* and the *Lou Gehrig*. While I felt more akin to the *Gehrig*, since the Yankee ballplayer had been a resident of my hometown—New Rochelle, New York—I was put on the *Kossuth*. When all the troops were on board, the ships left the harbor and lined up in a large convoy, escorted by naval warships. We had a Navy gun crew fore and aft, but otherwise the ship was manned by a Merchant Marine crew.

It was a slow ride across the channel, and largely uneventful. We slept in two shifts, switching from bunks to deck. The only food was either C or K rations. There was a large kettle at the back of the ship where we could heat the cans and get water for Nescafe®.

We just sat there, passing the time of day and watching what was going on at Utah Beach. Finally, on the morning of July 22, a launch pulled up alongside, and Major McNamara climbed up the rope that was hanging down the side of the *Kossuth*. He called us all together at the ship's stern and told us we were about ready to get off the ship and start on our new adventure in Normandy. We were indeed the second wave, and he knew we would prove ourselves to be true members of the 159th. He knew there would be casualties, but he also knew we would earn commendations for what we were about to do. He continued in that vein, then he said he would see us onshore. He went over the side of the ship again and proceeded on to the *Gehrig*, undoubtedly to make the same speech.

It was a cloudy afternoon as we were told to get ready to go over the side to a waiting "rhino," a large flat barge. We had all our belongings and weapons on our backs. Finally, my turn came to clamber onto the rope netting and start my descent. I had visions of losing my grip and going for a swim in the English Channel, but I managed to get down and finally touch the deck of the rhino. Our trucks and other equipment also came over the side, and when we were loaded, the Sailors took off for the beach. The rhino went right up to the shore, and we jumped off onto our destination—Utah Beach, Normandy. We were taken to our section of the beach and waited for the battalion to assemble. We would have to spend the night on the beach, but the weather was decent, so that would not present a problem.

Night fell and, of course, there was a complete blackout on the beach. We were told to expect some German reconnaissance planes and, as predicted, our intelligence was correct. They were greeted by our antiaircraft guns, and soon "Bedcheck Charlie" left the area to make his next nightly visit. In the morning, we got on our trucks and moved off the beach, which was full of other troops and supplies, all waiting to go inland. It was a massive job to have assembled everything, and now we were going off on our own for our first mission.

As the 159th rolled away from the beach, we had our first views of Normandy. Our first stop was St. Mere Eglise, a town at the heart of the American airborne operations on D-Day, and it looked largely destroyed. We were on narrow country roads, passing many farms behind the massive hedgerows on both sides of the road that marked the boundaries between the various farms. Finally, our group pulled into a farm area surrounded by the hedgerows. We unloaded and set up our camouflage netting to conceal our location. We were well used to our routine of loading and unloading our equipment on the back of our 2 1/2-ton truck. We were to get lots more practice.

We set up our tactical operations center under some trees alongside the hedgerow. As part of the Headquarters and Service Company of the 159th, we had plenty of work to catch up on. So we spent a busy afternoon sorting all our material and finding a place where we would spend the night. We had to be careful about exposing our location, because the Germans were not too far from our site in Barneville. At that time, the American position in Normandy, while secure, was not too deep. The 159th was given the mission of clearing mines and maintaining the roads. We were now part of XV Corps and 3d Army.

News soon reached us of the battalion's first casualties; two privates in Company B had been killed while clearing mines. Their first day of work marked their deaths. Such are the perils and uncertainties of war.

We were on the road, moving toward St. Lo, when an attack was launched to take the town, which marked the breakout from Normandy and the steady advance toward Paris and, in our case, toward Brest, the seaport at the western tip, right on the Atlantic Ocean. I can still see and hear the planes flying overhead, on their way to bomb the Germans. I had never seen so many planes before, and the noise was deafening when they loosed their bombs on the targets. Within a few days, we were in the vicinity of Avranches, which marked the spot where the 159th turned toward Brittany and the eventual target of Brest. It had been an important port for the American Army in World War I, and now it was decided we should take it again to relieve the pressure on the Normandy ports.

Bulldozers level ballast on an abandoned railway roadbed as Soldiers from the 159th Engineer Combat Battalion construct a highway to move supplies to the front across the Our River in the 3d Army sector. February 13, 1945

The battalion was placed into Task Force A, and it was to be deployed primarily as infantry in the big push through Brittany. It was decided to leave the Personnel Section (which included me) behind for the time being in the big field we occupied. There were ten of us, including our commanding warrant officer. We were given plenty of C and K rations and little else, besides all our records. We said our farewells to our friends as they left, and we set to work organizing our own area. We were on the main highway leading from the beaches, and it had been designated a "Red Ball Express" highway. Only priority units could use the road, because getting supplies to the front was considered paramount. This gave us an observation point from which to see everything passing our front door, 24 hours a day. We had to establish our own security, and then we set out to keep up with our daily routine.

There were no other outfits located in our immediate vicinity; we were our own outpost. We were really on detached service, for want of a better term. One afternoon, rifle fire jolted us out of our routine. No one was hit, but we went on alert and checked out the few houses at the far side of our field. We never found the shooter, but it didn't happen again. We knew Brittany was completely occupied by the Germans, and that meant plenty of combat for the 159th. My Personnel Section was itching to rejoin the rest of the battalion, but we had no communication with the outfit. Finally, after more than a week of waiting, a truck came to pick us up. That afternoon we arrived at headquarters, west of Morlaix.

The battalion was constantly on the move, as the American forces kept forcing the Germans back to their last line of defense, the city of Brest, which finally fell in late September. Within a few days, orders came through for VIII Corps, of which we were a part, to move northeast to Belgium. VIII Corps had been expanded greatly during the Brest campaign and, during its course, it became the sole corps in the newly formed 9th Army. The 159th packed up and headed off on a long overland movement. We drove back through Brittany, where we were greeted with enthusiasm in each town. On the second afternoon of our trip, we passed to the west of Paris, and we could see the Eiffel Tower in the distance. That night we camped in a field in St. Quentin, and the next day we finally reached our destination—Bastogne, Belgium. We found our bivouac area and spent the next few days there, waiting for a permanent location to be selected. Bastogne was the headquarters of VIII Corps until the Battle of the Bulge occurred and German pressure around the city—coupled with successive U.S. withdrawals in the area—forced the Corps headquarters to relocate to the vicinity of Neufchateau, about 20 miles southwest of Bastogne. After a few days, we headed off to nearby Luxembourg. My company wound up in the small farming community of Useldange.

We were quartered in the local school, our first indoor location since our arrival on the continent and a big improvement over all those fields we had slept in. It looked as if we were going to stay put for a while at least. The battalion was assigned to do road and bridge repairs, for the most part—basic engineering work. The whole of Luxembourg had been secured, and there were several infantry divisions nearby that had come from Brittany. Battalion headquarters had been placed in a fine stone house next to the remains of an 11th century tower and wall. In a few days, my section moved into the chateau too.

The people in Luxembourg were very friendly and really felt indebted to the Americans for freeing them from the Nazis. This 2 1/2-month period before the onset of the Battle of the Bulge proved to be the best duty the battalion had in its stay overseas. Luxembourg had become a quiet area that required normal engineering work and little combat. Gradually, the full-strength infantry divisions that had been in this Ardennes area were being shifted, most of them to the Huertgen Forest on the German-Belgian border. They were engaged in a vicious battle of attrition and suffered many casualties. As the original divisions involved were depleted, the fresh divisions from our area were sent to take their places. Our Personnel Section stayed put and did its usual day-to-day work.

Our area was supposed to be a quiet paradise for war-weary troops. The 9th Armored Division had just come over from the States, and one unit was quartered in Useldange. We heard that the 4th and 28th Infantry Divisions had also come into the area after being mauled in the Huertgen Forest. Without warning, on December 16, 1944, the Battle of the Bulge erupted. Confusion and panic reigned at first; orders came through to our battalion headquarters for the 159th to link up with the 4th Infantry Division in the Consdorf region of Luxembourg. On December 17, all the line companies, plus elements of Headquarters and Service Company, moved out to be deployed as infantry alongside the 4th Division.

Back in Useldange, the remainder of Headquarters and Service Company went on full alert. We had to take up the slack for the part of our unit that had moved up to Consdorf to join the 4th Division. We became responsible for the security of the area, which meant the addition of guard duty and other chores to our day-to-day assignments. The sudden, unexpected attack had really changed our thinking. One moment, we had been looking forward to the holiday season, and the next moment, war consumed our thoughts. The weather had turned nasty, and snow began to fall. That first night, I was assigned to guard a critical pumping station. We drove out to a back-road location nestled in a group of trees. I was told that a Luxembourger who was in charge of the station would come along during the night to do maintenance and see that all was in order. However, my mind imagined other, more frightening scenarios.

It was very cold; snow covered the ground, and the night was very dark. I walked around the area frequently, as much to keep warm as anything else. I heard a motorbike approaching as I was standing near the building. I could make out the silhouette of a tall man, dressed in a full-length leather coat, getting off the motorbike. I hailed him and asked for identification. He spoke some English and told me he was the man in charge of the pumping station. I breathed a sigh of relief, as I really did not want to tangle with a saboteur that night. He opened the station, and we went in. He checked the equipment, and we had a brief conversation in German. I told him I would be back several times during my tour of duty that night. I was happy I had an excuse to get in out of the cold a few times, and the shift passed a little more quickly by adding some conversation to the mix. I was happy when my replacement came along, and I took him in to meet the technician. Then, it was back to Useldange for some much-needed sleep. The weather remained overcast with periods of snow and fog. It was definitely not a time for flying, so we couldn't expect any air support.

We all waited for any news about how our friends were doing up at the front, a short distance away. There was interchange between the different locations, but there was very little specific information. We heard that the German attack had caught us by surprise, and they had achieved some early success. The saying "fog of war" truly applied. We did get delivery of *Stars and Stripes*, a well-written daily GI newspaper, but the action was so intense and changing so rapidly that it was not an up-to-date account of the situation. Basically, we relied on our headquarters in Consdorf for news. As the days passed, we heard that the battalion was seeing quite a bit of action, and there had been many casualties. It was a confusing and frightening time.

One of the problems was the lack of knowledge as to how far the Germans had advanced in our area. Basically, we did not have any patrols out but relied on our drivers who were in the area. We decided to go to the three towns where the line companies were located and retrieve the things they had left behind when they rushed out to the front. The next morning, I was assigned to go to Bettborn, about 5 miles away, to get Company B's belongings. We took a couple of trucks and took off, not knowing who was there. Bettborn proved to be deserted, since the Luxembourgers had also evacuated. We went to the houses that we knew had been used by our colleagues and did a fast job of assembling everything—mainly duffel bags—and throwing them onto the trucks. Then we headed back to Useldange to unload what we had collected. We found out that all our locations were still in our sector, and they stayed that way throughout the battle. This was very fortunate, because other nearby towns, such as Ettelbruck, had been taken and largely destroyed.

The overcast skies finally broke on December 23, and we began to hear the sound of the American planes and see them overhead. This would make a great difference, and we all were encouraged. We were still getting fragmentary reports about the battalion, but nothing definitive. Our part of Headquarters and Service Company was ordered to move to Rollingergrund, a section on the northern edge of Luxembourg City, so we packed everything and prepared to move out. It was a sad occasion for us, as we had been there for two months and had developed many friendships and much mutual admiration between the Luxembourgers and ourselves. This was one of the frequent reminders that you couldn't become too sentimental at times like this, but still there was a lot of emotion when we finally pulled out. It was no longer unusual for us to simply pack up and go at a moment's notice. The Personnel Section was sent to a school, and we set up our operations there. We continued with our extended duties and hoped the rest of the battalion would join us soon. The next day, the 159th arrived, and it was a relief for all of us to be reunited.

We moved into several houses in Trois Vierges, Luxembourg, and went about our work. The Germans had occupied the town, but much of it wasn't as heavily damaged as this. There was quite a bit of water in the streets, but the billets were still dry. Then the Germans opened a dam and flooded the town, forcing us to relocate. February 2, 1945

Our compatriots told us about the heavy fighting they had faced in the Consdorf–Scheidgen area. There, a part of our Company C, collocated with Company B, held off elements of a Volks-Grenadier division on Hill 313, a strategic piece of terrain overlooking a vital road network. Company B caught the full force of the initial assault, supported by intense German artillery fire. Our combat engineers had no working radios and were greatly outnumbered. They had no protection for their flanks and no artillery or air support. Almost out of ammunition, they were forced to fall back to Scheidgen; but to our surprise and relief, the Germans made no move to pursue them. As we questioned our buddies, we learned that there had been considerable casualties—scores of deaths and many wounded, plus others who had sustained trench foot and had been evacuated.

As we reconstituted, it was evident that the men were visibly exhausted by their ordeal and wanted sleep above all. Finally, on Christmas Day, the 159th pulled out of Luxembourg City and moved back to the Belgian–French border at Charleville–Messincourt. The cooks did a commendable job putting together a Christmas meal that we ate in the courtyard of the chateau where we were quartered. Of course, there was a great deal of conversation about what had just happened. Everyone was very upbeat, though still mourning the loss of so many friends. As it began to get dark, an American Cadillac sedan, painted OD, pulled up. When I saw the two stars on the bumper plaque, I knew we had an important visitor. It turned out to be Major General William "Wild Bill" Donovan, commander of the Office of Strategic Services (OSS), World War I Medal of Honor recipient, and (later) father of the CIA. It was not safe to be out on strange roads once night fell, and he was traveling without a convoy, so it made sense for him to join us and have a good dinner. At that time, the leading edge of the battlefield was still very fluid, and great caution had to be exercised at all times. We had all heard about English-speaking German soldiers wearing American uniforms who had been circulating behind our lines. Many of them were caught and executed as spies, but we were still uneasy and on guard. Memorizing the challenge and password took on greater importance.

The 159th stayed in the area for several days, regrouping and waiting for our next assignment. Right after the new year, we started to push back into Belgium. The battles and tremendously heavy traffic had taken their toll on the roads. Many of them had almost disappeared, and heavy maintenance and rebuilding had to start at once so the Allies could continue the advance. We were headed back to the Bastogne area, which the 101st Airborne Division had defended so valiantly. Maintenance became a 24-hour-a-day job, and the 159th did many innovative things to expedite the work. For example, we took over sawmills and cut many logs and operated a rock quarry to get materials. We were shorthanded because of the losses we had suffered, but everyone pitched in to accomplish the job. By January 17, the battalion reached Bastogne and started to help clear roads there. We stayed in most locations for a few days and, as the American Army retook the Bulge territory, we kept moving eastward toward Germany. This was to be our pattern of operations during that time. Some of our wounded GIs returned as they recovered during hospital stays. Many had left the hospitals and found their way back on their own, so great was their desire to rejoin their comrades.

On January 31, Headquarters and Service Company pulled into Trois Vierges, a small town almost on the German border at the northern tip of Luxembourg. Although the Germans had occupied it, the town was not too heavily damaged. We moved into several houses and went about our work. Many of the inhabitants returned upon our arrival, and we tried to make them as comfortable as possible. The Germans, however, were not about to leave the matter there. There was quite a bit of water in the streets, but the billets were still dry. Then the Germans opened a dam and the water came flooding into Trois Vierges, forcing us into a hasty relocation.

We moved to Steffeshausen, Belgium, and using this area as our base of operations, began the engineering work needed throughout the area. The main job was restoring the roads, which were still in a terrible state. Frankly, those roads hadn't been designed to withstand the heavy traffic of an army at war. The 159th was working on a 24-hour schedule to accomplish its task, and even the clerks had to help out in cutting down and hauling trees for corduroy roads. One work detail had a visit from General George S. Patton while he was on an inspection tour. The battalion was completely immersed in backbreaking engineering tasks, and working under extremely difficult conditions. The weather was still bad with frequent snow, which caused many weather-related casualties.

In addition to *Stars and Stripes*, we also got *Yank*, a magazine all about Army life, as well as paperback editions of books and overseas editions of various magazines, such as *Life*. It was a pleasure reading *Life*, because it contained only pictures and print stories, but no advertising. Of course, we lived under blackout conditions at all times, but we had generators, so we had lights when there was no local lighting. Our battalion was also lucky, because one of its missions was to provide fresh water for the outfits in our area. We even rigged up a portable shower we could use when we were in one spot for several days.

After the Battle of the Bulge, forward progress became very slow. The Germans had retreated behind their Siegfried Line, and our commanders in this area were content to wait for the right moment before launching any major operations. We knew we would have to get across both the Moselle and Rhine Rivers, both formidable tasks. In the meantime, we prepared the roads and bridges so we had good movement in our own area.

Finally, the time came to advance into Germany proper from our area along the Belgian–Luxembourg border. Company A crossed into Germany on February 23, and the other companies followed by early March. We were in what amounted to a backwater section of the country; it was not heavily populated, and what few towns were there had been virtually destroyed in the fighting and bombing. Our immediate objective was to proceed to the Koblenz area so we could prepare to cross the rivers. On March 15, we were in Mulheim, preparing to take the 87th Infantry Division across the Moselle and to erect a pontoon bridge for permanent access. As with all the bridges we built, we placed a sign at the entrance of the bridge notifying all concerned that they were crossing courtesy of the 159th Engineer Combat Battalion. The only thing we didn't do, unfortunately, was charge a toll.

The next objective was the crossing and bridging of the mighty Rhine—the largest natural barrier we had to overcome. We were in Boppard, on the west bank of the river, on March 26. The mission, again, was to take the 87th Infantry Division across in assault boats, then erect a pontoon bridge. The battalion accomplished its mission, this time under heavy fire, and the American Army was then on the west bank of the Rhine in another sector. Now the Army was ready to really roll eastward across Germany.

Once across the Rhine, we found German resistance becoming more sporadic. The 159th was attached to various infantry divisions, and we followed closely as they continued their relentless push. We did stay in Boppard for several days, seeing to it that the new bridge was properly maintained, and by April 1 we were in Kamp. This was to be one of many one- and two-night stands during the march eastward. We would attend to whatever maintenance needed to be done and assist in rounding up the great numbers of German soldiers who were surrendering. On April 12, we were in the small town of Friedwald when we got word that President Franklin Roosevelt had died. We were in a state of disbelief, because most of us had known no other president. He had been a figure larger than life, and we wondered about his successor, Harry S. Truman.

The battalion was assigned to do military government work as we pushed through Thuringia. Most of the small towns were relatively intact, since no battles had taken place there; the larger cities had been the targets. I recall the town of Konigsee, a small resort area with several hotels. The German civilians who had been fleeing our advance seemed to collect

Operations had more or less come to a halt in our area. We had been in Apolda, Germany, for several days, when I met a commercial photographer who saw me taking pictures in a park across from the building in which we were living. Since I spoke German, we had a conversation, and he told me that he had a photo studio. He offered to take a photo of me and my fellow GIs. May 1, 1945

there because of the available facilities. We worked with the bürgermeister (mayor), telling him what the rules were to be. The Germans were resigned to their fate by this time and, while they were sullen, they did not cause trouble. They obeyed our orders, turning in all their weapons at the town hall. We saw large numbers of displaced persons or refugees wandering the roads. They were real victims of the Germans, and it was heartbreaking to watch them trudging along, with all their belongings on their backs or in rickety carts. I suspected that to them it made no difference whether their circumstances were the result of totalitarianism or liberty. War is ugly, cruel, and indiscriminate, regardless of the motives.

By April 21, we had reached Weimar. The center of the city had sustained some damage, but the area seemed to have survived quite well. It was here that we came upon Buchenwald Concentration Camp. The sights there were beyond comprehension. Some of the former prisoners were still there in their striped outfits. Everyone seemed to be on the verge of death. Wasted bodies were all over the place, many of them stacked on carts. It was a sight that sickened all the American Soldiers. How could human beings inflict such brutality on these people? It was a question we all asked one another. Regrettably, the horrific scene was repeated in many locations throughout Europe.

It was now May 8—Victory in Europe (VE) Day. When we reached Verviers, the Belgians were celebrating the end of the war in Europe. The next morning, a few of us boarded a train for our long-awaited rest and recuperation (R&R) trip to Paris. It was a very slow ride, because the roadbeds were still not fully ready for heavy-duty traffic. We pulled into the Gare du Nord (north station) in early afternoon and were lined up and assigned to our hotels. I was sent to the Elysee Hotel, a small walk-up building across the Rue de l'Elysee from the presidential home, the Elysee Palace. To top it off, the American embassy was around the corner. It was a great location, but the wonder was how this hotel got there. Who could complain, considering the circumstances?

It was a sunny afternoon, and the weather remained good for our three-day stay. But like all good things, our trip came to an end much too soon, and we were back on the train to Verviers. We stayed in the same Belgian army barracks we had used on the way to Paris. We were thankful that this time things were much quieter. The next morning we were back on our truck for the long ride back to eastern Germany. The trip had many detours, because many of the bridges on the autobahns had been destroyed. We thought we were heading back to Erfurt and then Apolda, but we were told that the battalion was no longer there but was now living in tents near Werda and the Czechoslovakian border. What a comedown! It was a rather rude shock after our trip to Paris.

We went back to doing military government work, and in our trips around the area, we still saw the long lines of refugees and German soldiers walking along. When we talked to the German civilians, we were all struck by the fact that they all claimed not to have been Nazis. We just never met Nazis. It made us wonder who was doing all that shooting at us if no one was a Nazi.

We soon found out that our battalion had been assigned to Antwerp, Belgium, to erect a troop redeployment center. With the war in Europe over, much of the Army had to be sent to the Asiatic–Pacific Theater to help end the war there. It sounded like a good assignment and, while some units were being marked for disbanding, it would keep us all together. On May 31, the battalion loaded up and moved out for the two-day overland journey to Antwerp. We stayed on the autobahns for the most part, but there were detours because of destroyed bridges. We frequently saw hordes of displaced people and German soldiers moving along. We also saw large barbed-wire enclosures holding German soldiers who had become prisoners of war (POWs).

Outside of Cologne, I could see the twin towers of its famous church. We came through Heerlen, the Netherlands, and soon we were in eastern Belgium. Late that afternoon, we arrived in Antwerp. We were directed to a large open area near the Scheldt River. The next day the battalion began to erect a large tent city that would accommodate thousands of troops. This was to be a tremendous task, and we even had the assistance of many German POWs who had been put to work. The tent city, named *Camp Tophat*, was located within the city of Antwerp but in a section called the *other side*, meaning that it was on the opposite side of the river from the developed old city. There was a tunnel that connected the two sections, and we always needed transportation to get into the main part of the city, the second-largest city in Belgium. The port along the Scheldt was one of the largest in Europe. The city had been a target of Hitler's V-1 and V-2 revenge weapons. You could see sporadic damage throughout the city where the bombs and rockets had landed, but the damage didn't compare to what we had seen in Germany.

Our Personnel Section kept busy with all the paperwork that had to be done. The Army announced a point system so that those who had been in the Army longest would have an opportunity to be discharged. We had some high-point men, but the majority—including me—were not qualified for quick release. At that time, we considered ourselves fortunate to have accumulated five battle stars, each worth five points, for the campaigns we had been through. The possibility of being sent to the Pacific loomed large in our minds but, in the meantime, we did our everyday work and took advantage of the fact that we were in a lively city with much to offer. It was a simple matter for the men to get into the city, as there were no real restrictions on passes—you just waited for one of the trucks headed that way. Getting back was equally easy.

I found that we were permitted to visit the capital city of Brussels, which was only a half-hour train ride away. I made several trips there, always with my camera at the ready. Brussels had been declared an "open city," so it came through the war intact. The only obvious exception was the missing dome on the gigantic Palace of Justice. Brussels is a flat city, so the Germans had installed their radar in the dome of the building. When they retreated, they put thermite bombs in the dome and exploded them. The metal dome melted into the building and caused great damage to the central part of the edifice.

One of our main topics of everyday conversation was our possible destination after Antwerp. We received word that the 159th was scheduled to be disbanded at some point. We did lose some high-point men, but we no longer received replacements. We did our daily work, finishing Camp Tophat and awaiting its occupants. We followed the events unfolding in the Pacific, sure that most of us would end up there to finally bring closure to the war. Then, on August 6, we heard about the dropping of the atomic bomb on Hiroshima, followed three days later by the bomb on Nagasaki, and it looked like this would end the war. We were surprised the Japanese didn't surrender at once, but it was not in their makeup to do so. Finally, on August 15, Victory Over Japan (VJ) Day was proclaimed. The war had come to a successful conclusion. Many plans were going to be changed, mine included.

On August 19, orders were issued for my transfer to the 2d Military Government Regiment, headquartered in Bad Homburg, Germany. I was really shocked, as I had completely forgotten about my application for transfer to military government. Who would think the Army would find a lowly PFC and order his individual movement? But it happened, and at this late stage of the game, I was not too happy. My biggest worry was that members of military government would be declared essential and would not be able to go home on schedule. But there was nothing to be done except to make the move, and on August 26, I boarded a train that would travel through Brussels and Paris and take me back to Germany and my new assignment.

Although my job was interesting, and I had an opportunity to travel in and around the area, I anxiously waited for my turn to go home. My point score was nearing the right total for a trip back to the United States and, at the end of October, orders transferring me to the homeward-bound 29th Infantry Division came through. When I reached division headquarters, I was sent to the 111th Field Artillery Battalion located in Nordenham, across the river from Bremerhaven on the northern coast of Germany.

Finally, word came through that we would be sailing at 1800 hours on January 1, 1946—a wonderful way to start the new year. We had only a short ride to board our C2 freighter *Bienville*, which was larger than the Liberty and Victory ships, but had the same type of accommodations. The ship had four-tier bunks, and I was on the bottom. We all went up on deck to watch the departure from the dock, then we sailed down the Weser River to the English Channel. The trip was supposed to take 10 days to our destination of New York. After days of storms, the weather finally turned nice, but then most of the ship's engines broke down. The *Bienville* barely moved along, and the trip stretched to 15 days.

There were the usual conversations about going home and what that meant. Many dreams were coming to the fore, along with doses of nostalgia. It was a happy time, after all these men had gone through, to reach this point. Finally, the *Bienville* limped into New York Harbor and made its way to a pier in Staten Island. It was early in the morning of January 15, and it didn't take long to get our belongings together and get off the ship. We were transported to Camp Kilmer, New Jersey, a large camp that only handled troops coming back or going out through the Port of New York.

At Camp Kilmer, we went through a series of medical examinations and interviews, and before long, I was on my way to Fort Dix, New Jersey, to undergo the final processing for my discharge. We turned in our extra uniforms and equipment and packed our duffel bags for the last time with whatever was left. Finally, we were given our discharge papers and final pay.

I took a bus to the train station in Trenton, New Jersey, and waited for the train to New York. It was quite a treat to look out the window and see the American landscape again after 19 months overseas. When we reached Pennsylvania Station, a group of us took a cab to Grand Central Station. Now I was in familiar territory, and I proceeded to the New Haven Railroad train to New Rochelle. I knew my mother and father would be waiting for me in the store on Main Street. Because I had the duffel bag, I decided to take a cab from the station instead of walking, as I had always done. In the midafternoon of January 19, 1946, I finally finished my long journey home. It was an exciting and emotional moment when I opened the front door to the store and raced in to greet my mother and father. From Soldier to civilian, I started to put behind me my time as a combat engineer and an eyewitness to the horrors of war.

Mr. Mendelsohn grew up in New Rochelle, New York. His Army experience included basic training at the Fort Belvoir Engineer Replacement Training Center and then assignment to the 159th Engineer Combat Battalion, which was preparing to go overseas. In July 1944, the battalion landed in Normandy and went from there to the German-Czechoslovakian border in May 1945. After discharge from the Army, he returned to the family's retail business, where he remained and expanded the business. He took part in many civic and business activities through the years. Now retired and living in Greensboro, North Carolina, he is one of the few survivors of the 159th Engineer Combat Battalion's Headquarters and Service Company that saw action in the Battle of the Bulge.

Dr. Hennen served on active duty as a military policeman and military intelligence officer, retiring in 1997. Since that time, he has been the headmaster at New York Military Academy in Cornwall-on-Hudson, New York.

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Note: Mr. Mendelsohn was interviewed by Max Hastings for his book *Armageddon: The Battle for Germany*, which was published in 2004.

Engineer Update

Transition from ARTEP/MTPs to CATS. The U.S. Army has transitioned from using the Army Training and Evaluation Program (ARTEP) mission training plans (MTPs) as a collective training tool to using the combined arms training strategy (CATS). A CATS is a unit training strategy which, as an entity, takes the entire training planning process from the cradle to the grave. A CATS is developed from a unit's base table of organization and equipment (TOE) and Department of the Army-approved mission statement. They are designed using the training model of crawl-walk-run. Commanders will make the final determination as to which tasks should be trained and at what level the training should begin, since they will know their unit's training status. Included in CATS are the required training resources such as Class III and Class V materials and training aids, devices, simulators, and simulations (TADSS). The current ARTEP/ MTPs that are located on the Reimer Digital Library (RDL) are scheduled to be removed from the RDL (TBD). CATS are located on Army Knowledge Online (AKO) on their own dedicated page. The planned end state is movement of CATS to the Digital Training Management System (DTMS) once it is fully fielded. Additionally, the Collective Training Division of the United States Army Engineer School developed a website on the Engineer Portal that will also have links to CATS and files available for download. The following links will take you to the AKO CATS site and to the Engineer Portal.

AKO CATS Link: <*https://Army Knowledge Online*>.

Engineer Portal Link: <*https://www.mwu.army.mil/portal/eng/index.php*>.

The point of contact at the Engineer School Collective Training Division is <*donald.durst@us.army.mil*> or call (573) 563-6237.

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Engineer Doctrine Contact Update. As of 15 August 2007, the Engineer School's Doctrine Division was consolidated at the Maneuver Support Center (MANSCEN) level to the MANSCEN Directorate of Training (MDoT) Doctrine Division. The Engineer Doctrine element still retains the lead for the Regiment's doctrine with only a few minor changes in physical locations and contact information.

The mailing address for written correspondence has changed to: Commandant, United States Army Engineer School, ATTN: ATZT-TDD-E, 320 MANSCEN Loop, Suite 220, Fort Leonard Wood, Missouri 65473-8929.The telephone numbers remain the same: Doctrine Chief, (573) 563-8161; Senior Doctrine Analyst, (573) 563-7332 (DSN prefix, 676-).

The generic NIPR e-mail address for electronic correspondence has changed to <*leon.mdottddengdoc@conus.army.mil*>.

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Maneuver Support Center (MANSCEN) and Engineer School Lessons Learned Integration (L2I) Cell. MANSCEN and the United States Army Engineer School L2I Cell need your help. To keep training, doctrine, and combat developments current and to prepare for the future, it is critical that the school continuously receive relevant engineer observations, insights, and lessons (OIL). The L2I analyst can derive information from a variety of sources: unit after-action reports (AARs); tactics, techniques, and procedures (TTPs) used by units in and returning from theater; Soldier observations/submissions to the Engineer School; and requests for information (RFIs). This information is used to conduct doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) gap analyses and to determine solutions. These solutions are distributed to the Engineer Regiment via new doctrine and training products, *Engineer* (The Professional Bulletin of Army Engineers) and other publications, websites, and by answering RFIs. With the modular transformation in full swing, many engineer units are looking for sample tactical standard operating procedures (TACSOPs) for the new units being established. You can help by forwarding any of these materials from your unit's deployment to the L2I analyst. Unclassified information can be sent to <*michael.e.meyer@us.army.mil*>. Classified information can be sent by secure Internet protocol, routed (SIPR) e-mail to <*michael.meyer@us.army.smil.mil*>. For more information, call (573) 563-3820.

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2008 Engineer Unit Directory. The 2008 United States Army Engineer Unit Directory is available online in Adobe PDF format at <*http://www.wood.army.mil/engrmag/Engr%20Unit%20Dir/2007Directoryonline.pdf*>. Since many unit addresses have changed recently, take a moment and see if your unit's listing is correct. Changes to the Unit Directory can be made by calling (573) 563-7644 or e-mailing <*leon.engineer@conus.army.mil*>.

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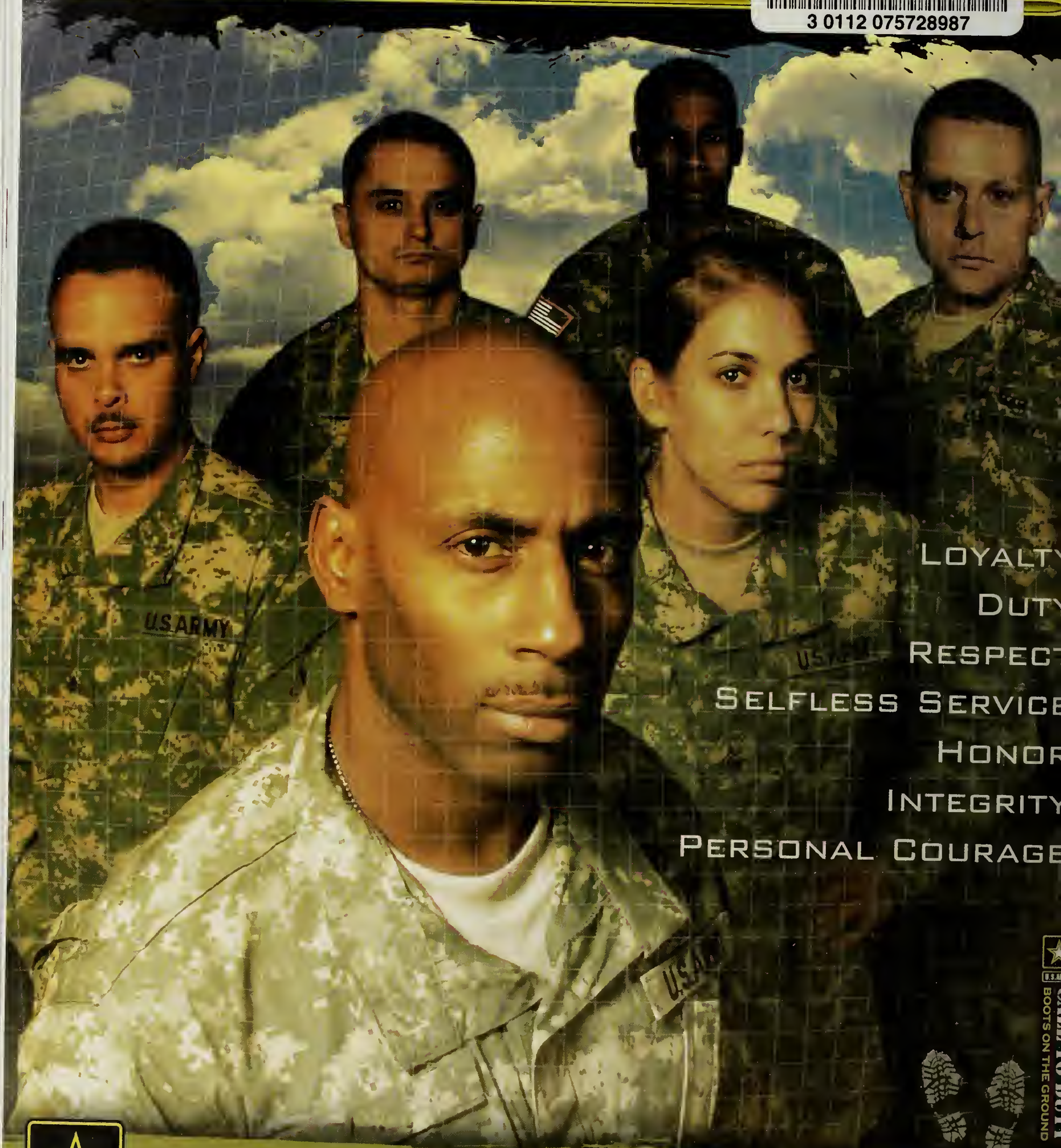

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